Revised 1/22/2015

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

Air Quality Division

New Source Review Permit Application Form

Is this an addendum to an existing application?

Yes X No _____ Date of Application: **7/30/2015**

Previous Application #: **A0000777**

COMPANY INFORMATION:

Company Name: Jonah Energy LLC
Address: 707 17th Street, Suite 2700
City: Denver State: Colorado Zip Code: 80202
Country: USA Phone Number: 720.577.1000

FACILITY INFORMATION:

Facility Name: YP 4-12 Compressor Engine
New Facility or Existing Facility: Existing
Facility Description: Compressor Engine - Line Pressure Reduction Project
Facility Class: Minor Operating Status: Not Yet Installed
Facility Type: Production Site

For Oil & Gas Production Sites ONLY:

First Date of Production (FDOP)/Date of Modification: **TBD-Engine included herein not yet installed**
Does production at this facility contain H2S?* No
If yes, contact the Division.
API Number(s):

NAICS Code:

FACILITY LOCATION:

***Enter the facility location in either the latitude/longitude area or section/township/range area. Both are not required.**

Physical Address:
City:
State: WY County:

OR

Latitude: 42.42305 Longitude: -109.76083 County: Sublette
Quarter Quarter: NW Quarter: NW
Section: 12 Township: 28N Range: 109W

For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)

CONTACT INFORMATION:

***Note that an Environmental AND NSR Permitting Contact is required for your application to be deemed complete by the agency.**

Title: Mr. First Name: Charles
Last Name: Cornell
Company Name: Jonah Energy LLC
Job Title: Sr. Regulatory Lead
Address: 707 17th Street, Suite 2700
City: Denver State: Colorado
Zip Code: 80202
Primary Phone No.: 720.577.1251 E-mail: chuck.cornell@jonahenergy.com
Mobile Phone No.: 970.988.6067 Fax No.:
Contact Type: Environmental contact Start Date: October 6, 2014

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Additional Contact Type (if needed): NSR Permitting contact
Title: First Name:
Last Name:
Company Name:
Job Title:
Address:
City: State:
Zip Code:
Primary Phone No.: E-mail:
Mobile Phone No.: Fax No.:
Contact Type: Start Date:

FACILITY APPLICATION INFORMATION:

General Info:

Has the facility changed location or is it a new/ greenfield facility?	No
Has a Land Use Planning document been included in this application?	No
Is the facility located in a sage grouse core area?*	No
If the facility is in a sage grouse core area, what is the WER number?	

** For questions about sage grouse core area, contact WY Game & Fish Department.*

Federal Rules Applicability - Facility Level:

Prevention of Significant Deterioration (PSD):	No
Non-Attainment New Source Review:	No

Modeling Section:

Has the Air Quality Division been contacted to determine if modeling is required?	No
Is a modeling analysis part of this application?	No
Is the proposed project subject to Prevention of Significant Deterioration (PSD) requirements?	No
Has the Air Quality Division been notified to schedule a pre-application meeting?	No
Has a modeling protocol been submitted to and approved by the Air Quality Division?	No
Has the Air Quality Division received a Q/D analysis to submit to the respective FLMs to determine the need for an AQRV analysis?	No

Required Attachments:

Facility Map	☑
Process Flow Diagram	☑
Modeling Analysis (if applicable)	☐
Land Use Planning Document	☐
Detailed Project Description	☑
Emissions Calculations	☑

I, Charles Cornell (Responsible Official (Printed Name)) Sr. Regulatory Lead (Title)

an Official Representative of the Company, state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further certify that the operational information provided and emission rates listed on this application reflect the anticipated emissions due to the operation of this facility. The facility will operate in compliance with all applicable Wyoming Air Quality Standards and Regulations.

Signature: (ink) Date: 7/30/2015

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Specific Emission Unit Attributes:

Engine

Company Equipment ID: E1

Company Equipment Description: Natural Gas-Fired Compressor Engine

Operating Status: Not Yet Installed

Initial Construction Commencement Date: TBD

Initial Operation Commencement Date: TBD

Most Recent Construction/ Modification Commencement Date: TBD

Most Recent Operation Commencement Date: TBD

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason:

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Replacement compressor engine to replace existing compressor engine currently operating at the YP 4-12 production location under Air Quality Waiver wv-16956-1 dated October 23, 2014, and as extended under Air Quality Permit wv-16956-1 Extension dated July 17, 2015

Name Plate Rating: 1035 HP @ 1400 RPM Units: hp

Site Rating: 973 Units: hp

Primary Fuel Type: Field Gas

Secondary Fuel Type:

Model Name and Number: G3512B

Engine Type: 4 Stroke Lean Burn

Serial Number Tracking Table:

Serial Number: TBD Order Date: TBD

Manufacturer Name: Caterpillar

Construction/Installation Commencement Date: TBD

Operation Commencement/ Start-up Date: TBD

Manufacture Date: TBD

Btu Content: 1120 Units: Btu/scf

Fuel Sulfur Content: Neg Units:

Type of Service: Compression

Is diesel engine EPA Tier Certified? * If yes, list EPA Tier Rating

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment: Yes

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: CO, VOC

Proposed BACT: Oxidation catalyst with AFRC

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant:

Proposed LAER:

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Affected

New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources.

NSPS Subpart: *Subpart JJJJ*

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart:

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject but Exempt

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: Subpart ZZZZ

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Specific Emission Unit Attributes:

Heater/Chiller

Company Equipment ID: H1
Company Equipment Description: Indirect Heater #1 - 0.5 MMBtu/hr unit

Operating Status: Operating
Initial Construction Commencement Date: Jan-15
Initial Operation Commencement Date: 2/16/2015
Most Recent Construction/ Modification Commencement Date: Jan-15

Most Recent Operation Commencement Date: 2/16/2015

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Other

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Continued operation of line heater as part of compressor engine line pressure reduction

Firing Type: Indirect
Heat Input Rating: 0.5 Units: MMBtu/hr
Primary Fuel Type: Field Gas
Secondary Fuel Type:
Heat Content of Fuel: 1120 Units: BTU/scf
Fuel Sulfur Content: Neg Units:

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2310021100

Potential Operating Schedule: Provide the operating schedule for this emission unit.
Hours/day: 24
Hours/year: 8760

Control Equipment: No

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources.

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Not Affected

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Specific Emission Unit Attributes:

Heater/Chiller

Company Equipment ID: H2
Company Equipment Description: Indirect Heater #2 - 0.5 MMBtu/hr unit

Operating Status: Operating
Initial Construction Commencement Date: Jan-15
Initial Operation Commencement Date: 2/16/2015
Most Recent Construction/ Modification Commencement Date: Jan-15

Most Recent Operation Commencement Date: 2/16/2015

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Other

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Continued operation of line heater as part of compressor engine line pressure reduction

Firing Type: Indirect
Heat Input Rating: 0.5 Units: MMBtu/hr
Primary Fuel Type: Field Gas
Secondary Fuel Type:
Heat Content of Fuel: 1120 Units: BTU/scf
Fuel Sulfur Content: Neg Units:

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2310021100

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24
Hours/year: 8760

Control Equipment: No

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources.

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Not Affected

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

			Efficiency Standards				
		Pre-Controlled Potential Emissions (tons/year)	Potential to Emit (PTE)	Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/year)	Basis for Determination
Criteria Pollutants:							
1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)				0.10	0.43	AP-42
2.)	PM #10 microns in diameter (PE/PM10)				0.10	0.43	AP-42
3.)	PM #2.5 microns in diameter (PE/PM2.5)				0.10	0.43	AP-42
4.)	Sulfur dioxide (SO2)				0.13	0.6	Other
5.)	Nitrogen Oxides (NOx)				1.17	5.1	Other
6.)	Carbon monoxide (CO)				2.23	9.8	Other
7.)	Volatile organic compounds (VOC)				1.51	6.6	Other
8.)	Lead (Pb)				Neg	Neg	
9.)	Total Hazardous Air Pollutants (HAPs)				0.18	1.43	AP-42
10.)	Fluoride (F)				N/A	N/A	
11.)	Hydrogen Sulfide (H2S)				N/A	N/A	
12.)	Mercury (Hg)				N/A	N/A	
13.)	Total Reduced Sulfur (TRS)				N/A	N/A	
14.)	Sulfuric Acid Mist (SAM)				N/A	N/A	

Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminents

Pollutants:		Pre-Controlled Potential Emissions (tons/year)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/year)	Basis for Determination
1.)	Formaldehyde				0.15	0.66	
2.)	Acetaldehyde				0.08	0.33	
3.)	Acrolein				0.05	0.21	
4.)	Methanol				0.02	0.11	
5.)							
6.)							

Greenhouse Gases (GHGs)

Pollutants:		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)							
2.)							
3.)							
4.)							
5.)							
6.)							

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Control Equipment:

Oxidation Catalyst

Manufacturer: TBD
Date Installed: TBD
Model Name and Number: TBD
Company Control Equipment ID:
Company Control Equipment Description: Oxidation catalyst with AFRC

Pollutant(s) Controlled:

☑ CO	☐ NOx	☐ Pb	☐ SO2	☑ VOC	☐ PM	
☐ PM (FIL)	☐ PM Condensible	☐ PM 10 (FIL)	☐ PM 2.5 (FIL)		☐ PM 10	☐ PM 2.5
☐ Other						

NOTE: The following fields require numeric values unless otherwise denoted with an asterisk*

Design Control Efficiency (%):
Capture Efficiency (%):
Operating Control Efficiency (%):
Catalyst Type:* Oxidation Catalyst
Air Fuel Ratio Controller:* Yes

☑ This is the only control equipment on this air contaminant source

If not, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List all other emission units that are also vented to this control equipment:* N/A

List all release point IDs associated with this control equipment:* E1

Release Point Information:

Complete the table below for ***each*** release point. Please include release point information for each emission unit. Multiple attachments may be necessary. A release point is a point at which emissions from an emission unit are released into the ambient (outside)air. List each individual release point on a separate pair of lines (release point ID and description). ***For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)***

Stack Release Point Information		
Company Release Point ID:	Release Point Type:	Vertical
YP 4-12	Release Point Latitude:	42.42305
E1-stack	Release Point Longitude:	-109.76083
Company Release Point Description:	Base Elevation (ft):	7127
YP 4-12	Stack Height (ft):	21.0
Compressor engine exhaust stack	Stack Diameter (ft):	1.00
	Exit Gas Velocity (ft/s):	113.4
	Exit Gas Temp (F):	975
	Exit Gas Flow Rate (acfm):	5,343
Company Release Point ID:	Release Point Type:	
	Release Point Latitude:	
	Release Point Longitude:	
Company Release Point Description:	Base Elevation (ft):	
	Stack Height (ft):	
	Stack Diameter (ft):	
	Exit Gas Velocity (ft/s):	
	Exit Gas Temp (F):	
	Exit Gas Flow Rate (acfm):	
Company Release Point ID:	Release Point Type:	
	Release Point Latitude:	
	Release Point Longitude:	
Company Release Point Description:	Base Elevation (ft):	
	Stack Height (ft):	
	Stack Diameter (ft):	
	Exit Gas Velocity (ft/s):	
	Exit Gas Temp (F):	
	Exit Gas Flow Rate (acfm):	
Company Release Point ID:	Release Point Type:	
	Release Point Latitude:	
	Release Point Longitude:	
Company Release Point Description:	Base Elevation (ft):	
	Stack Height (ft):	
	Stack Diameter (ft):	
	Exit Gas Velocity (ft/s):	
	Exit Gas Temp (F):	
	Exit Gas Flow Rate (acfm):	

Complete the table below for each fugitive (area, volume, line) release point. List each individual release point on a separate line.

Fugitive Release Point Information	
Company Release Point ID:	Release Point Latitude: _____
	Release Point Longitude: _____
	Release Height (ft): _____
Company Release Point Description:	
Company Release Point ID:	Release Point Latitude: _____
	Release Point Longitude: _____
	Release Height (ft): _____
Company Release Point Description:	
Company Release Point ID:	Release Point Latitude: _____
	Release Point Longitude: _____
	Release Height (ft): _____
Company Release Point Description:	
Company Release Point ID:	Release Point Latitude: _____
	Release Point Longitude: _____
	Release Height (ft): _____
Company Release Point Description:	

G3512B

GAS ENGINE TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1400	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	8:1	FUEL:	Nat Gas
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	CAT WIDE RANGE WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 2 INLET (°F):	130		
AFTERCOOLER - STAGE 1 INLET (°F):	201	FUEL PRESSURE RANGE(psig):	7.0-40.0
JACKET WATER OUTLET (°F):	203	FUEL METHANE NUMBER:	80
ASPIRATION:	TA	FUEL LHV (Btu/scf):	905
COOLING SYSTEM:	JW+OC+1AC, 2AC	ALTITUDE CAPABILITY AT 100°F INLET AIR TEMP. (ft):	6000
CONTROL SYSTEM:	ADEM3	APPLICATION:	Gas Compression
EXHAUST MANIFOLD:	DRY		
COMBUSTION:	Low Emission		
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5		

RATING		NOTES	LOAD	100%	75%	50%
ENGINE POWER	(WITHOUT FAN)	(1)	bhp	1035	776	518
ENGINE EFFICIENCY	(ISO 3046/1)	(2)	%	35.2	33.6	30.8
ENGINE EFFICIENCY	(NOMINAL)	(2)	%	34.5	32.9	30.2
ENGINE DATA						
FUEL CONSUMPTION	(ISO 3046/1)	(3)	Btu/bhp-hr	7237	7584	8259
FUEL CONSUMPTION	(NOMINAL)	(3)	Btu/bhp-hr	7377	7731	8419
AIR FLOW (77°F, 14.7 psia)	(WET)	(4) (5)	ft3/min	2337	1836	1257
AIR FLOW	(WET)	(4) (5)	lb/hr	10364	8139	5573
FUEL FLOW (60°F, 14.7 psia)			scfm	141	111	80
COMPRESSOR OUT PRESSURE			in Hg(abs)	99.4	91.1	68.2
COMPRESSOR OUT TEMPERATURE			°F	364	344	273
AFTERCOOLER AIR OUT TEMPERATURE			°F	134	136	134
INLET MAN. PRESSURE		(6)	in Hg(abs)	90.5	73.2	51.8
INLET MAN. TEMPERATURE	(MEASURED IN PLENUM)	(7)	°F	136	139	138
TIMING		(8)	°BTDC	30	28	24
EXHAUST TEMPERATURE - ENGINE OUTLET		(9)	°F	975	979	1005
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(10) (5)	ft3/min	6737	5305	3711
EXHAUST GAS MASS FLOW	(WET)	(10) (5)	lb/hr	10750	8442	5792
EMISSIONS DATA - ENGINE OUT						
NOx (as NO2)		(11)(12)	g/bhp-hr	0.50	0.50	0.50
CO		(11)(13)	g/bhp-hr	2.24	2.30	2.29
THC (mol. wt. of 15.84)		(11)(13)	g/bhp-hr	4.92	4.61	4.56
NMHC (mol. wt. of 15.84)		(11)(13)	g/bhp-hr	0.74	0.69	0.68
NMNEHC (VOCs) (mol. wt. of 15.84)		(11)(13)(14)	g/bhp-hr	0.49	0.46	0.46
HCHO (Formaldehyde)		(11)(13)	g/bhp-hr	0.52	0.54	0.62
CO2		(11)(13)	g/bhp-hr	456	482	514
EXHAUST OXYGEN		(11)(15)	% DRY	9.6	9.2	8.8
LAMBDA		(11)(15)		1.69	1.69	1.60
ENERGY BALANCE DATA						
LHV INPUT		(16)	Btu/min	127256	100022	72614
HEAT REJECTION TO JACKET WATER (JW)		(17)(25)	Btu/min	17396	14223	14146
HEAT REJECTION TO ATMOSPHERE		(18)	Btu/min	4664	3887	3110
HEAT REJECTION TO LUBE OIL (OC)		(19)(25)	Btu/min	3963	3593	3135
HEAT REJECTION TO EXHAUST (LHV TO 77°F)		(20)(21)	Btu/min	45863	35927	25381
HEAT REJECTION TO EXHAUST (LHV TO 350°F)		(20)	Btu/min	30216	23885	17148
HEAT REJECTION TO A/C - STAGE 1 (1AC)		(22)(25)	Btu/min	6400	5038	1781
HEAT REJECTION TO A/C - STAGE 2 (2AC)		(23)(26)	Btu/min	4247	3604	2283
PUMP POWER		(24)	Btu/min	833	833	833

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1. (Standard reference conditions of 77°F, 29.60 in Hg barometric pressure.) No overload permitted at rating shown. Consult the altitude deration factor chart for applications that exceed the rated altitude or temperature.

Emission levels are at engine exhaust flange prior to any after treatment. Values are based on engine operating at steady state conditions, adjusted to the specified NOx level at 100% load. Tolerances specified are dependent upon fuel quality. Fuel methane number cannot vary more than ± 3.

For notes information consult page three.

FUEL USAGE GUIDE

CAT METHANE NUMBER	30	35	40	45	50	55	60	65	70	75	80	85
SET POINT TIMING	28	28	28	29	29	29	29	30	30	30	30	30
DERATION FACTOR	1	1	1	1	1	1	1	1	1	1	1	1

ALTITUDE DERATION FACTORS AT RATED SPEED

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1	1	1	1	1	1	0.97	0.91	0.84	0.77	No Rating	No Rating	No Rating
120	1	1	1	1	1	1	0.98	0.92	0.85	0.79	No Rating	No Rating	No Rating
110	1	1	1	1	1	1	0.99	0.93	0.86	0.80	No Rating	No Rating	No Rating
100	1	1	1	1	1	1	1	0.94	0.88	0.81	0.75	No Rating	No Rating
90	1	1	1	1	1	1	1	0.94	0.88	0.81	0.75	No Rating	No Rating
80	1	1	1	1	1	1	1	0.94	0.88	0.81	0.75	No Rating	No Rating
70	1	1	1	1	1	1	1	0.94	0.88	0.81	0.75	No Rating	No Rating
60	1	1	1	1	1	1	1	0.94	0.88	0.81	0.75	No Rating	No Rating
50	1	1	1	1	1	1	1	0.94	0.88	0.81	0.75	No Rating	No Rating

ALTITUDE (FEET ABOVE SEA LEVEL)

AFTERCOOLER HEAT REJECTION FACTORS (ACHRF)

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1.33	1.38	1.43	1.48	1.53	1.58	1.64	1.64	1.64	1.64	No Rating	No Rating	No Rating
120	1.26	1.31	1.36	1.41	1.46	1.51	1.57	1.57	1.57	1.57	No Rating	No Rating	No Rating
110	1.20	1.24	1.29	1.34	1.39	1.44	1.49	1.49	1.49	1.49	No Rating	No Rating	No Rating
100	1.13	1.18	1.22	1.27	1.32	1.37	1.42	1.42	1.42	1.42	1.42	No Rating	No Rating
90	1.06	1.11	1.16	1.20	1.25	1.30	1.35	1.35	1.35	1.35	1.35	No Rating	No Rating
80	1	1.04	1.09	1.13	1.18	1.23	1.28	1.28	1.28	1.28	1.28	No Rating	No Rating
70	1	1	1.02	1.07	1.11	1.16	1.21	1.21	1.21	1.21	1.21	No Rating	No Rating
60	1	1	1	1	1.04	1.09	1.14	1.14	1.14	1.14	1.14	No Rating	No Rating
50	1	1	1	1	1	1.02	1.06	1.06	1.06	1.06	1.06	No Rating	No Rating

ALTITUDE (FEET ABOVE SEA LEVEL)

MINIMUM SPEED CAPABILITY AT THE RATED SPEED'S SITE TORQUE (RPM)

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	900	900	900	900	900	920	950	980	1010	1040	No Rating	No Rating	No Rating
120	900	900	900	900	900	910	940	970	1010	1040	No Rating	No Rating	No Rating
110	900	900	900	900	900	910	940	970	1000	1030	No Rating	No Rating	No Rating
100	900	900	900	900	900	900	930	960	990	1020	1050	No Rating	No Rating
90	900	900	900	900	900	900	930	960	990	1020	1050	No Rating	No Rating
80	900	900	900	900	900	900	930	960	990	1020	1050	No Rating	No Rating
70	900	900	900	900	900	900	930	960	990	1020	1050	No Rating	No Rating
60	900	900	900	900	900	900	930	960	990	1020	1050	No Rating	No Rating
50	900	900	900	900	900	900	930	960	990	1020	1050	No Rating	No Rating

ALTITUDE (FEET ABOVE SEA LEVEL)

FUEL USAGE GUIDE:

This table shows the derate factor and full load set point timing required for a given fuel. Note that deration and set point timing reduction may be required as the methane number decreases. Methane number is a scale to measure detonation characteristics of various fuels. The methane number of a fuel is determined by using the Caterpillar methane number calculation program.

ALTITUDE DERATION FACTORS:

This table shows the deration required for various air inlet temperatures and altitudes. Use this information along with the fuel usage guide chart to help determine actual engine power for your site.

ACTUAL ENGINE RATING:

To determine the actual rating of the engine at site conditions, one must consider separately, limitations due to fuel characteristics and air system limitations. The Fuel Usage Guide deration establishes fuel limitations. The Altitude/Temperature deration factors and RPC (reference the Caterpillar Methane Program) establish air system limitations. RPC comes into play when the Altitude/Temperature deration is less than 1.0 (100%). Under this condition, add the two factors together. When the site conditions do not require an Altitude/ Temperature derate (factor is 1.0), it is assumed the turbocharger has sufficient capability to overcome the low fuel relative power, and RPC is ignored. To determine the actual power available, take the lowest rating between 1) and 2).

1) Fuel Usage Guide Deration
2) 1-((1-Altitude/Temperature Deration) + (1-RPC))

AFTERCOOLER HEAT REJECTION FACTORS(ACHRF):

To maintain a constant air inlet manifold temperature, as the inlet air temperature goes up, so must the heat rejection. As altitude increases, the turbocharger must work harder to overcome the lower atmospheric pressure. This increases the amount of heat that must be removed from the inlet air by the aftercooler. Use the aftercooler heat rejection factor (ACHRF) to adjust for inlet air temp and altitude conditions. See notes 25 and 26 for application of this factor in calculating the heat exchanger sizing criteria. Failure to properly account for these factors could result in detonation and cause the engine to shutdown or fail.

MINIMUM SPEED CAPABILITY AT THE RATED SPEED'S SITE TORQUE (RPM):

This table shows the minimum allowable engine turndown speed where the engine will maintain the Rated Speed's Torque for the given ambient conditions. For some ambient conditions, the engine is not capable of being loaded continuously from idle to the max site torque at the indicated speed.

NOTES:

1. Engine rating is with two engine driven water pumps. Tolerance is ± 3% of full load.
2. ISO 3046/1 engine efficiency tolerance is (+)0, (-)5% of full load % efficiency value. Nominal engine efficiency tolerance is ± 3.0% of full load % efficiency value.
3. ISO 3046/1 fuel consumption tolerance is (+)5, (-)0% of full load data. Nominal fuel consumption tolerance is ± 3.0% of full load data.
4. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.
5. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.
6. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.
7. Inlet manifold temperature is a nominal value with a tolerance of ± 9°F.
8. Timing indicated is for use with the minimum fuel methane number specified. Consult the appropriate fuel usage guide for timing at other methane numbers.
9. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.
10. Exhaust flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 6 %.
11. Emissions data is at engine exhaust flange prior to any after treatment.
12. NOx values are "Not to Exceed".
13. CO, CO2, THC, NMHC, NMNEHC, and HCHO values are "Not to Exceed" levels. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.
14. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ
15. Exhaust Oxygen tolerance is ± 0.5; Lambda tolerance is ± 0.05. Lambda and Exhaust Oxygen level are the result of adjusting the engine to operate at the specified NOx level.
16. LHV rate tolerance is ± 3.0%.
17. Heat rejection to jacket water value displayed includes heat to jacket water alone. Value is based on treated water. Tolerance is ± 10% of full load data.
18. Heat rejection to atmosphere based on treated water. Tolerance is ± 50% of full load data.
19. Lube oil heat rate based on treated water. Tolerance is ± 20% of full load data.
20. Exhaust heat rate based on treated water. Tolerance is ± 10% of full load data.
21. Heat rejection to exhaust (LHV to 77°F) value shown includes unburned fuel and is not intended to be used for sizing or recovery calculations.
22. Heat rejection to A/C - Stage 1 based on treated water. Tolerance is ±5% of full load data.
23. Heat rejection to A/C - Stage 2 based on treated water. Tolerance is ±5% of full load data.
24. Pump power includes engine driven jacket water and aftercooler water pumps. Engine brake power includes effects of pump power.
25. Total Jacket Water Circuit heat rejection is calculated as: (JW x 1.1) + (OC x 1.2) + (1AC x 1.05) + [0.85 x (1AC + 2AC) x (ACHRF - 1) x 1.05]. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.
26. Total Second Stage Aftercooler Circuit heat rejection is calculated as: (2AC x 1.05) + [(1AC + 2AC) x 0.15 x (ACHRF - 1) x 1.05]. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.

FREE FIELD MECHANICAL & EXHAUST NOISE

MECHANICAL: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	Overall	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	1035	115.6	74.7	78.0	79.4	85.1	85.4	88.9	91.7	96.1	97.9	100.2
75	776	114.6	73.8	78.3	79.5	83.9	84.9	88.3	90.8	95.8	97.3	100.0
50	518	112.4	72.7	76.5	79.0	81.5	83.6	85.6	91.0	95.1	96.3	99.6

MECHANICAL: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	1035	103.3	102.8	101.8	103.5	102.5	99.0	99.0	105.5	99.7	112.6	92.0
75	776	103.9	102.0	100.5	102.9	102.2	100.3	102.9	105.7	104.8	109.3	96.1
50	518	103.4	100.0	98.6	101.4	101.6	99.4	102.2	105.5	102.7	96.6	93.1

EXHAUST: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	Overall	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	1035	128.4	102.8	100.5	110.3	112.1	113.9	101.3	101.9	106.9	111.2	113.4
75	776	123.3	99.7	98.7	107.5	110.1	109.3	100.0	101.6	106.8	119.6	107.4
50	518	118.2	100.0	98.1	106.0	109.3	110.2	95.9	97.6	104.3	108.3	103.2

EXHAUST: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	1035	107.8	111.6	114.4	119.9	119.5	118.6	119.7	120.3	118.9	118.2	114.3
75	776	102.1	103.8	102.8	105.8	106.5	111.8	112.9	110.7	110.0	109.3	106.0
50	518	99.4	99.4	99.4	101.4	102.8	106.1	107.5	106.8	105.2	104.8	101.0

SOUND PARAMETER DEFINITION:

Sound Power Level Data - DM8702-01

Sound power is defined as the total sound energy emanating from a source irrespective of direction or distance. Sound power level data is presented under two index headings:
Sound power level -- Mechanical
Sound power level -- Exhaust

Mechanical: Sound power level data is calculated in accordance with ISO 6798. The data is recorded with the exhaust sound source isolated.

Exhaust: Sound power level data is calculated in accordance with ISO 6798 Annex A.

Measurements made in accordance with ISO 6798 for engine and exhaust sound level only. No cooling system noise is included unless specifically indicated. Sound level data is indicative of noise levels recorded on one engine sample in a survey grade 3 environment.

How an engine is packaged, installed and the site acoustical environment will affect the site specific sound levels. For site specific sound level guarantees, sound data collection needs to be done on-site or under similar conditions.

Summary of Critiera Pollutant Emissions
Jonah Energy LLC
Yellow Point 4-12 Compressor Engine -- Waiver wv-16956-1 Replacement Engine

Unit ID	Source	NOx		CO		VOC		SO2		PM10 / PM2.5	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
E1	Caterpillar G3512B natural gas-fired lean-burn compressor engine, site-rated 973 HP	1.07	4.70	2.14	9.39	1.50	6.58	0.12	0.51	0.09	0.40
H1	Natural gas-fired separator heater #1, 0.5 MMBtu/hr	0.05	0.21	0.04	0.18	0.003	0.01	0.01	0.03	0.004	0.02
H2	Natural gas-fired separator heater #2, 0.5 MMBtu/hr	0.05	0.21	0.04	0.18	0.003	0.01	0.01	0.03	0.004	0.02
	Totals	**1.17**	**5.1**	**2.23**	**9.8**	**1.51**	**6.6**	**0.13**	**0.56**	**0.10**	**0.43**

Notes:
(1) Engine and heater emissions are based upon a maximum of 8760 operating hours

CALCULATIONS AND COMPUTATIONS

Emission Source:	Compressor Engine	
Source Type:	Natural Gas-Fired RICE - Lean Burn	
Site-Rated Horsepower (HP)	973	Requested Permitted Horsepower
Maximum Fuel Usage (Btu/bhp-hr)	9345	Manf Spec Sheet @ 50% load * 1.11 (HHV)
Number of Units:	1	
Natural Gas Heating Value (BTU/scf)	1120	Analysis Data
Sulfur Content of Fuel (grains/scf):	0.05	Estimated
Operating Hours per Year:	8760	

One (1) **Compressor Engine**

Compound	Emission Factor (a)	Emission Rate	
		Hourly (b) (Lbs/Hr)	Annual (c) (Tons/Year)
NOx	0.5	1.07	4.70
CO	1.0	2.14	9.39
VOC	0.7	1.50	6.58
HCHO	0.07	0.15	0.66
SO2	0.013	0.12	0.51
PM-10 - total	0.01	0.09	0.40

Notes:

(a) Emission factors for NOx, CO, VOC and HCHO (g/hp-hr) based upon proposed WDEQ BACT limits
Emission factor for SO2 (lb/MMBtu) based maximum estimated sulfur content of natural gas of 5 grains/100 scf
PM10 emission factor (lb/MMBtu) from USEPA AP-42, Chapter 3.2, Table 3.2-2 (4SLB), dated July 2000.
PM10 emission factor includes PM10 filterable and PM condensable

(b) Hourly Emission Rate (Lbs/Hr) = (Emission Factor, g/hp-hr) * (Horsepower, HP) / 453.6
Hourly Emission Rate (Lbs/Hr) = (Emission Factor, lb/MMBtu) * (Horsepower, HP) * (Fuel Consumption, Btu/bhp-hr) / 1,000,000

(c) Annual Emission Rate (Tons/Yr) = (Hourly Emission Rate, Lbs/Hr) * (Hour of Operation Per Year, Hr/Yr) / (2,000 Lbs/Ton)

Calculations and Computations

Pollutant	Type[a]	Emission Factor AP-42 Section 3.2, 7/00 - Natural Gas-Fired Reciprocating Engines - Lean Burn (g/bhp-hr)	(lb/MMBtu)[d]	Rating	Natural Gas Combustion: Maximum Heat Input, one engine (MMBtu/Hr)[b]	Average Heat Input, one engine (MMBtu/Hr)[c]	Natural Gas-Fired Compressor Engine Emissions: Emission Rate, One Engine Hourly[e] (lb/hr)	Annual (lbs/yr)	Annual[f] (tpy)	Emission Rate, One Engines Hourly[e] (lb/hr)	Annual[f] (tpy)	Major (Y/N)
1,1,2,2-Tetrachloroethane	HAP		4.00E-05	E	9.09	9.09	3.64E-04	3.2	1.59E-03	3.64E-04	1.59E-03	No
1,1,2-Trichloroethane	HAP		3.18E-05	E	9.09	9.09	2.89E-04	2.5	1.27E-03	2.89E-04	1.27E-03	No
1,3-Butadiene	HAP		2.67E-04	D	9.09	9.09	2.43E-03	21.3	1.06E-02	2.43E-03	1.06E-02	No
1,3-Dichloropropene	HAP		2.64E-05	E	9.09	9.09	2.40E-04	2.1	1.05E-03	2.40E-04	1.05E-03	No
2-Methylnaphthalene	HAP		3.32E-05	C	9.09	9.09	3.02E-04	2.6	1.32E-03	3.02E-04	1.32E-03	No
2,2,4-Trimethylpentane	HAP		2.50E-04	C	9.09	9.09	2.27E-03	19.9	9.96E-03	2.27E-03	9.96E-03	No
Acenaphthene	HAP		1.25E-06	C	9.09	9.09	1.14E-05	0.1	4.98E-05	1.14E-05	4.98E-05	No
Acenaphthylene	HAP		5.53E-06	C	9.09	9.09	5.03E-05	0.4	2.20E-04	5.03E-05	2.20E-04	No
Acetaldehyde	HAP		8.36E-03	A	9.09	9.09	7.60E-02	665.8	3.33E-01	7.60E-02	3.33E-01	No
Acrolein	HAP		5.14E-03	A	9.09	9.09	4.67E-02	409.4	2.05E-01	4.67E-02	2.05E-01	No
Benzene	HAP		4.40E-04	A	9.09	9.09	4.00E-03	35.0	1.75E-02	4.00E-03	1.75E-02	No
Benzo(b)fluoranthene	HAP		1.66E-07	D	9.09	9.09	1.51E-06	0.0	6.61E-06	1.51E-06	6.61E-06	No
Benzo(e)pyrene	HAP		4.15E-07	D	9.09	9.09	3.77E-06	0.0	1.65E-05	3.77E-06	1.65E-05	No
Benzo(g,h,i)perylene	HAP		4.14E-07	D	9.09	9.09	3.76E-06	0.0	1.65E-05	3.76E-06	1.65E-05	No
Biphenyl	HAP		2.12E-04	D	9.09	9.09	1.93E-03	16.9	8.44E-03	1.93E-03	8.44E-03	No
Carbon Tetrachloride	HAP		3.67E-05	E	9.09	9.09	3.34E-04	2.9	1.46E-03	3.34E-04	1.46E-03	No
Chlorobenzene	HAP		3.04E-05	E	9.09	9.09	2.76E-04	2.4	1.21E-03	2.76E-04	1.21E-03	No
Chloroform	HAP		2.85E-05	E	9.09	9.09	2.59E-04	2.3	1.13E-03	2.59E-04	1.13E-03	No
Chrysene	HAP		6.93E-07	C	9.09	9.09	6.30E-06	0.1	2.76E-05	6.30E-06	2.76E-05	No
Ethylbenzene	HAP		3.97E-05	B	9.09	9.09	3.61E-04	3.2	1.58E-03	3.61E-04	1.58E-03	No
Ethylene Dibromide	HAP		4.43E-05	E	9.09	9.09	4.03E-04	3.5	1.76E-03	4.03E-04	1.76E-03	No
Fluoranthene	HAP		1.11E-06	C	9.09	9.09	1.01E-05	0.1	4.42E-05	1.01E-05	4.42E-05	No
Fluorene	HAP		5.67E-06	C	9.09	9.09	5.16E-05	0.5	2.26E-04	5.16E-05	2.26E-04	No
Formaldehyde	HAP	0.07			9.09	9.09	0.00E+00	1315.2	6.58E-01	1.50E-01	6.58E-01	No
Methanol	HAP		2.50E-03	B	9.09	9.09	2.27E-02	199.1	9.96E-02	2.27E-02	9.96E-02	No
Methylene Chloride	HAP		2.00E-05	C	9.09	9.09	1.82E-04	1.6	7.96E-04	1.82E-04	7.96E-04	No
n-Hexane	HAP		1.11E-03	C	9.09	9.09	1.01E-02	88.4	4.42E-02	1.01E-02	4.42E-02	No
Naphthalene	HAP		7.44E-05	C	9.09	9.09	6.76E-04	5.9	2.96E-03	6.76E-04	2.96E-03	No
PAH	HAP		2.69E-05	D	9.09	9.09	2.45E-04	2.1	1.07E-03	2.45E-04	1.07E-03	No
Phenanthrene	HAP		1.04E-05	D	9.09	9.09	9.46E-05	0.8	4.14E-04	9.46E-05	4.14E-04	No
Pyrene	HAP		1.36E-06	C	9.09	9.09	1.24E-05	0.1	5.42E-05	1.24E-05	5.42E-05	No
Styrene	HAP		2.36E-05	E	9.09	9.09	2.15E-04	1.9	9.40E-04	2.15E-04	9.40E-04	No
Tetrachloroethane	HAP		2.48E-06	D	9.09	9.09	2.25E-05	0.2	9.88E-05	2.25E-05	9.88E-05	No
Toluene	HAP		4.08E-04	B	9.09	9.09	3.71E-03	32.5	1.62E-02	3.71E-03	1.62E-02	No
Vinyl Chloride	HAP		1.49E-05	C	9.09	9.09	1.35E-04	1.2	5.93E-04	1.35E-04	5.93E-04	No
Xylene	HAP		1.84E-04	B	9.09	9.09	1.67E-03	14.7	7.33E-03	1.67E-03	7.33E-03	No
							0.18	2858.0				

Hours of Operation	8,760 hours/yr					
Number of Engines	1					
Horsepower	973 HP					
Fuel Consumption	9,345 Btu/bhp-hr	**Compressor Engine Total HAPs**	**1.43**		**1.43**	**No**
Heat Input	9.09 MMBtu/hr					
		Maximum Individual HAP	**0.66**		**0.66**	**No**
NSCR Control Efficiency =	0.0% Assume 0% for calcs					

Notes:

(a) Type = HAP for Hazardous Air Pollutant.

(b) Maximum heat input rate for the temporary compressor engine is based on calculated heat input rate of 9.09 MMBtu/hr

(c) Assume average heat input rate is the same as maximum heat input rate.

(d) Emission factors from AP-42, Section 3.2, Tables 3.2-2 for 4SLB engines except formaldehyde. Formaldehyde factor based on WDEQ BACT

(e) Hourly Emission Rate (lb/hr) = [Heat Input Rate (MMBtu/Hr) * Emission Factor (lb/MMBtu)]

(f) Annual Emission Rate (tpy) = (Average Hourly Emission Rate, lb/hr) * (8760 hr/yr) / (2,000 lb/ton)

CALCULATIONS AND COMPUTATIONS

Emission Source:	Separator Heaters	
Source Type:	Natural Gas-Fired Heaters	
Heat Input (mmBtu/hr):	0.50	Permitted heat input
Number of Units:	2	
Natural Gas Consumption (MMscf/yr)	3.9	calculated; one heater
Natural Gas Consumption (MMscf/yr)	7.8	calculated; 2 heaters
Natural Gas Heating Value (BTU/scf)	1120	Analysis Data
Sulfur Content of Fuel (grains/scf):	0.05	Estimated
Operating Hours per Year:	8760	

One **Separator Heater**

Compound	Emission Factor (a)	Emission Rate	
		Hourly (b) (Lbs/Hr)	Annual (c) (Tons/Year)
NOx	100	0.05	0.21
CO	84	0.04	0.18
VOC	5.5	0.003	0.01
SO2	1.27E-02	0.01	0.03
PM-10	7.60	0.004	0.02

Two **Separator Heaters**

Compound	Emission Factor (a)	Emission Rate	
		Hourly (b) (Lbs/Hr)	Annual (c) (Tons/Year)
NOx	100	0.10	0.43
CO	84	0.08	0.36
VOC	5.5	0.01	0.02
SO2	1.27E-02	0.01	0.06
PM-10	7.60	0.01	0.03

Notes:

(a) Emission factors (lb/MMscf) based on USEPA AP-42, Chapter 1.4, Tables 1.4-1 and 1.4-2, dated July 1998, except for SO2 Emission factor for SO2 (lb/MMBtu) based assumed sulfur content of natural gas

(b) Hourly Emission Rate (Lbs/Hr) except for SO2 = (Emission Factor, lb/MMscf) * (Heat Input, MMBtu/hr) * (Actual Natural Gas Heating Value, Btu/scf) / (AP-42 Natural Gas Heating Value, Btu/scf) / (AP-42 Natural Gas Heating Value, Btu/scf)

(b) Hourly Emission Rate (Lbs/Hr) for SO2 = (Emission Factor, Lb/MMBtu) * (Heat Input, MMBtu/hr)

(c) Annual Emission Rate (Tons/Yr) = (Hourly Emission Rate, Lbs/Hr) * (Hour of Operation Per Year, Hr/Yr) / (2,000 Lbs/Ton)

JONAH ENERGY LLC

March 26, 2015

Reviewer NTH
cc:
Modeler
D.E.
File A0000777
IMP FID 12121

Air Quality NSR Program
Wyoming Department of Environmental Quality
Air Quality Division
Herschler Building, 2-E
122 West 25th Street
Cheyenne, WY 82002

RE: Jonah Energy LLC
Request for C6 S2 Air Permit Application
Compressor Engine Located at YP 4-12 Production Facility
Sublette County, Wyoming

Dear WDEQ:

Jonah Energy LLC is submitting this letter along with the attached air permit forms and associated emissions to the Wyoming Department of Environmental Quality (WDEQ) Air Quality Division (AQD) to request the continued operation of one (1) compressor engine associated with a line pressure reduction project in the Jonah field of operations. This application is being submitted following the in-person meeting between Jonah Energy LLC and the WDEQ-AQD that occurred on September 26, 2014, and as mentioned in our subsequent email dated March 18, 2015 in which we requested the temporary pilot project be allowed to continue operation.

Jonah Energy is requesting that the WDEQ issue a C6 S2 air permit for the permanent installation of one (1) compressor engine as part of a line pressure reduction project to determine if a decrease in line pressure will result in an increase in production along with a decrease in emissions in the Jonah field. If successful, the decrease in emissions would be a result of the reduced line pressure minimizing tank flash emissions within the Jonah field. The line pressure reduction project would consist of installing a horizontal separator, up to two (2) low pressure separators and associated heaters and a compressor engine for a maximum of 8760 hours of operation.

Currently, the one (1) compressor engine and associated separator heaters have been installed at the Yellow Point (YP) 4-12 production facility. This compressor engine was authorized to operate on a temporary basis under Air Quality Waiver wv-16956-1, issued October 23, 2014. The start-up notification for the temporary pilot compressor engine authorized under Waiver wv-16956-1 was submitted to the WDEQ-AQD under cover dated February 19, 2015. As the operation of the compressor engine located at the YP 4-12 location is currently limited to six (6) months of operation from the date of start-up, Jonah Energy is requesting authorization to permanently operate the compressor engine at the YP 4-12 location.

The compressor engine that is currently operating at the YP 4-12 production facility is a natural gas-fired Caterpillar G3516 LE four-stroke lean-burn (4SLB) engine with a maximum nameplate horsepower (HP) of 1340 HP at 1400 RPM. It is important to note that although the maximum nameplate horsepower identified is 1340 HP, due to the approximate 7200 foot elevation of the YP 4-12 production facility and the limitations of the current well and pipeline configuration, the maximum site-rated horsepower is far less than 1340 HP and remains under the 1050 HP authorized under the current Air Quality Waiver wv-16956-1. The two (2) separator heaters associated with the line pressure reduction project each have a maximum rating of 0.5 MMBtu/hr heat input. Jonah Energy is requesting to operate the compressor engine and separator heaters up to 8760 hours per year.

Since the compressor engine that is currently operating at the YP 4-12 production facility is a rental unit, Jonah Energy would like to inform the WDEQ-AQD that under various circumstances a different make/model engine may be required to be installed in the instance the current engine configuration is no longer capable of operating. Jonah

Energy would like to request the flexibility of installing a different make/model engine in the instance the rental company revokes the current engine from Jonah Energy for a similar but different compressor engine. If a different compressor engine is installed, it will continue to remain less than the maximum horsepower that would be permitted under this application.

The associated WDEQ-AQD permit application forms, emission calculations and supporting documentation are included with the permit application submittal.

Chapter 6, Section 2(c)(ii) Offset Demonstration

In a letter dated July 21, 2008, the WDEQ issued an interim policy on demonstration of compliance with Wyoming Air Quality Standards and Regulations Chapter 6, Section 2(c)(ii) for sources in Sublette County. This interim policy requires air permit applications for new or modified emission sources of NO_X and/or VOC to be accompanied by a demonstration that the proposed facility will not prevent the attainment or maintenance of an ambient air quality standard. One option for such demonstration includes emission reductions for NO_X and/or VOC emissions. Emissions reductions that may be used as offsets include activities that result in NO_X and/or VOC emissions reductions within Sublette County, such as projects that result in a change of operation that occur after April 1, 2008.

An analysis of the NO_X and VOC emissions and offsets, if necessary, for the YP 4-12 compressor engine are identified in **Table 1**.

Table 1
Offset Emissions Analysis – YP 4-12 Compressor Engine

Facility Emissions	NO_X (tpy)	VOC (tpy)
Emissions Resulting After Compressor Engine Installation	9.5	6.5
Proposed Emissions Increase/(Decrease) From Proposed Modification	**9.5**	**6.5**
Offset Ratio	***1.1:1***	***1.5:1***
Emissions Required to be Offset	**10.5**	**9.8**

As the emissions resulting from the project will result in a minimal increase of NO_X and VOC, it can be presumed that the compressor engine addition to the YP 4-12 facility will not cause further impairment to ambient air quality due to the overall reduction of Jonah Energy's emissions from other permitting actions. Jonah Energy requests that the WDEQ offset the NO_X and VOC emissions from the compressor engine installation from Jonah Energy's offset bank. Jonah Energy understands that they have enough NO_X and VOC emission credits available to offset the emissions identified in **Table 1**. We understand that this project will satisfy the WDEQ's Chapter 6, Section 2(c)(ii) interim permitting policy for sources in Sublette County.

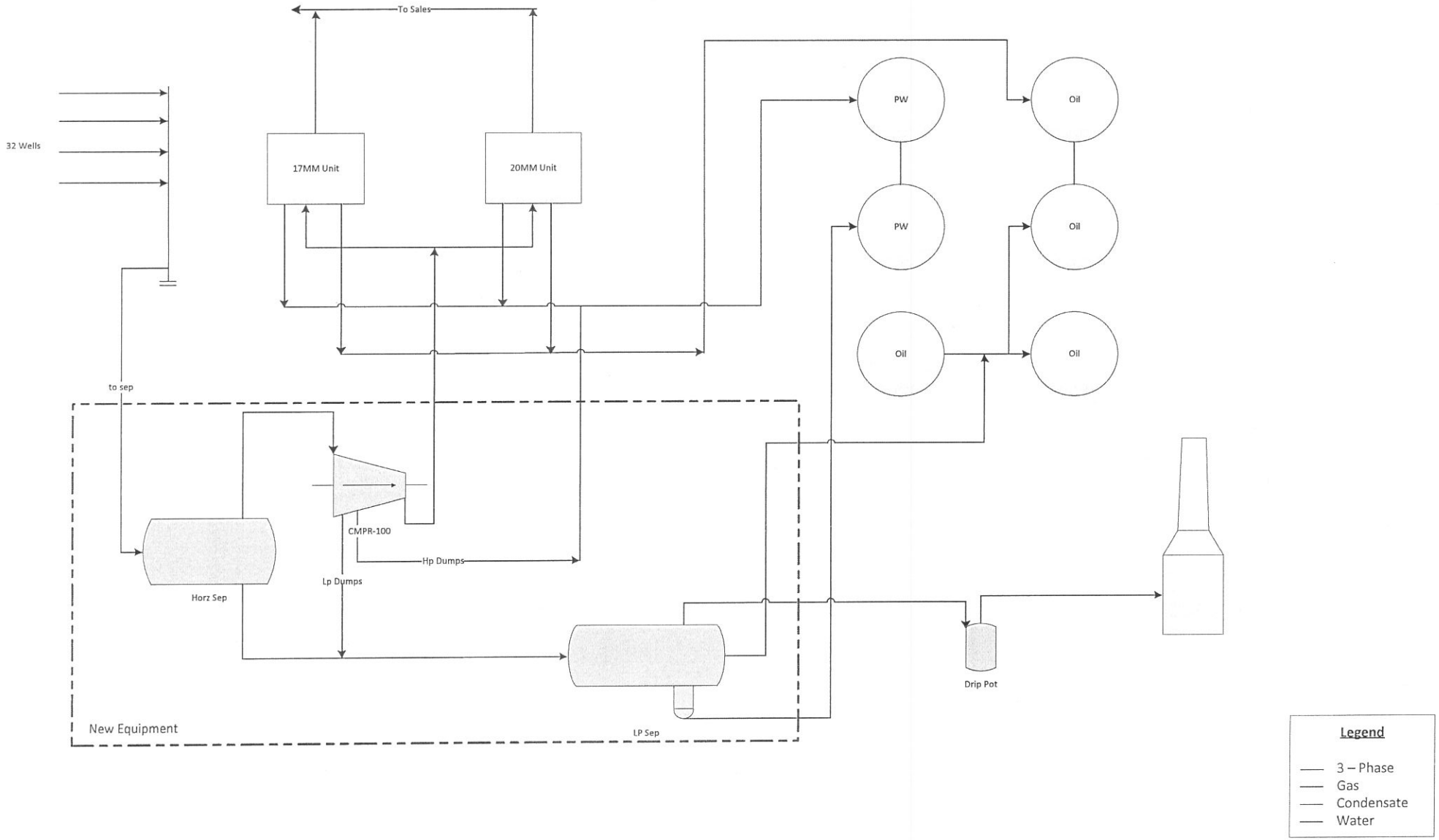
WDEQ permit application forms are included as **Attachment A**, supporting emission calculations along with the manufacturer specification sheets are included as **Attachment B**, and a current copy of Jonah Energy's offset bank spreadsheet is included as **Attachment C**. One original signed copy is enclosed, along with a CD that includes the electronic copies of the application forms and associated emissions calculations for the YP 4-12 compressor engine as part of the line pressure reduction project.

If you have any questions in regards to this application submittal, please contact me at 720.577.1251 or via email at chuck.cornell@jonahenergy.com.

Sincerely,

Charles Cornell
Sr. Regulatory Lead

Compressor Pilot PFD



ATTACHMENT A

WYOMING PERMIT APPLICATION FORMS

Revised 1/22/2015

DEQ
WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

Air Quality Division

New Source Review Permit Application Form

Is this an addendum to an existing application?

Yes _____ No X Date of Application: 3/26/2015

Previous Application #: _____

COMPANY INFORMATION:

Company Name: Jonah Energy LLC
Address: 707 17th Street, Suite 2700
City: Denver State: Colorado Zip Code: 80202
Country: USA Phone Number: 720.577.1000

FACILITY INFORMATION:

Facility Name: YP 4-12 Compressor Engine
New Facility or Existing Facility: Existing
Facility Description: Compressor Engine - Line Pressure Reduction Project
Facility Class: Minor Operating Status: Operating
Facility Type: Production Site

For Oil & Gas Production Sites ONLY:
First Date of Production (FDOP)/Date of Modification: **2/16/2015 for engine only**
Does production at this facility contain H2S?* No
If yes, contact the Division.
API Number(s): _____

NAICS Code: _____

FACILITY LOCATION:

Enter the facility location in either the latitude/longitude area or section/township/range area. Both are not required.
Physical Address: _____
City: _____
State: WY County: _____

OR

Latitude: 42.42305 Longitude: -109.76083 County: Sublette
Quarter Quarter: NW Quarter: NW
Section: 12 Township: 28N Range: 109W

For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)

CONTACT INFORMATION:

Note that an Environmental AND NSR Permitting Contact is required for your application to be deemed complete by the agency.
Title: Mr. First Name: Charles
Last Name: Cornell
Company Name: Jonah Energy LLC
Job Title: Sr. Regulatory Lead
Address: 707 17th Street, Suite 2700
City: Denver State: Colorado
Zip Code: 80202
Primary Phone No.: 720.577.1251 E-mail: chuck.cornell@jonahenergy.com
Mobile Phone No.: 970.988.6067 Fax No.: _____
Contact Type: Environmental contact Start Date: October 6, 2014

Revised 1/22/2015

Additional Contact Type (if needed): NSR Permitting contact
Title: First Name:
Last Name:
Company Name:
Job Title:
Address:
City: State:
Zip Code:
Primary Phone No.: E-mail:
Mobile Phone No.: Fax No.:
Contact Type: Start Date:

FACILITY APPLICATION INFORMATION:

General Info:

Has the facility changed location or is it a new/ greenfield facility?	No
Has a Land Use Planning document been included in this application?	No
Is the facility located in a sage grouse core area?*	No
If the facility is in a sage grouse core area, what is the WER number?	

** For questions about sage grouse core area, contact WY Game & Fish Department.*

Federal Rules Applicability - Facility Level:

Prevention of Significant Deterioration (PSD):	No
Non-Attainment New Source Review:	No

Modeling Section:

Has the Air Quality Division been contacted to determine if modeling is required?	No
Is a modeling analysis part of this application?	No
Is the proposed project subject to Prevention of Significant Deterioration (PSD) requirements?	No
Has the Air Quality Division been notified to schedule a pre-application meeting?	No
Has a modeling protocol been submitted to and approved by the Air Quality Division?	No
Has the Air Quality Division received a Q/D analysis to submit to the respective FLMs to determine the need for an AQRV analysis?	No

Required Attachments:

Facility Map	☑
Process Flow Diagram	☑
Modeling Analysis (if applicable)	☐
Land Use Planning Document	☐
Detailed Project Description	☑
Emissions Calculations	☑

I, Charles Cornell (Responsible Official (Printed Name)) Sr. Regulatory Lead (Title)

an Official Representative of the Company, state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further certify that the operational information provided and emission rates listed on this application reflect the anticipated emissions due to the operation of this facility. The facility will operate in compliance with all applicable Wyoming Air Quality Standards and Regulations.

Signature: (ink) Date: 3/26/2015

Revised 1/22/2015

Specific Emission Unit Attributes:

Engine

Company Equipment ID: E1
Company Equipment Description: Natural Gas-Fired Compressor Engine

Operating Status: Operating
Initial Construction Commencement Date: Jan-15
Initial Operation Commencement Date: 2/16/2015
Most Recent Construction/ Modification Commencement Date: Jan-15

Most Recent Operation Commencement Date: 2/16/2015

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason:

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Compressor Engine to continue operation at the YP 4-12 production location

Name Plate Rating: 1340 Units: hp
Site Rating: 912 Units: hp
Primary Fuel Type: Field Gas
Secondary Fuel Type:
Model Name and Number: G3516 LE
Engine Type: 4 Stroke Lean Burn
Serial Number Tracking Table:
Serial Number: 4EK04865 Order Date: January 2015
Manufacturer Name: Caterpillar
Construction/Installation Commencement Date: Jan-15
Operation Commencement/ Start-up Date: Jan-15
Manufacture Date: January 19, 2006
Btu Content: 1120 Units: Btu/scf
Fuel Sulfur Content: Neg Units:
Type of Service: Compression
Is diesel engine EPA Tier Certified? * If yes, list EPA Tier Rating

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

Potential Operating Schedule: Provide the operating schedule for this emission unit.
Hours/day: 24
Hours/year: 8760

Control Equipment: Yes

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: CO, VOC

Proposed BACT: Oxidation catalyst with AFRC

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant:

Proposed LAER:

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources.

NSPS Subpart:

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart:

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Affected

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: Subpart ZZZZ - Existing

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Revised 1/22/2015

Specific Emission Unit Attributes:

Heater/Chiller

Company Equipment ID: H1

Company Equipment Description: Indirect Heater #1 - 0.5 MMBtu/hr unit

Operating Status: Operating

Initial Construction Commencement Date: Jan-15

Initial Operation Commencement Date: 2/16/2015

Most Recent Construction/ Modification Commencement Date: Jan-15

Most Recent Operation Commencement Date: 2/16/2015

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Other

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Continued operation of line heater as part of compressor engine line pressure reduction

Firing Type: Indirect

Heat Input Rating: 0.5 Units: MMBtu/hr

Primary Fuel Type: Field Gas

Secondary Fuel Type:

Heat Content of Fuel: 1120 Units: BTU/scf

Fuel Sulfur Content: Neg Units:

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2310021100

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment: No

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources.

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Not Affected

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Revised 1/22/2015

Specific Emission Unit Attributes:

Heater/Chiller

Company Equipment ID: H2

Company Equipment Description: Indirect Heater #2 - 0.5 MMBtu/hr unit

Operating Status: Operating

Initial Construction Commencement Date: Jan-15

Initial Operation Commencement Date: 2/16/2015

Most Recent Construction/ Modification Commencement Date: Jan-15

Most Recent Operation Commencement Date: 2/16/2015

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Other

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:

Continued operation of line heater as part of compressor engine line pressure reduction

Firing Type: Indirect

Heat Input Rating: 0.5 Units: MMBtu/hr

Primary Fuel Type: Field Gas

Secondary Fuel Type:

Heat Content of Fuel: 1120 Units: BTU/scf

Fuel Sulfur Content: Neg Units:

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2310021100

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment: No

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60- Standards of Performance for New Stationary Sources.

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Not Affected

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Not Affected

These rules are found under WAQSR Chapter 6, Section 13.

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

			Efficiency Standards				
		Pre-Controlled Potential Emissions (tons/year)	Potential to Emit (PTE)	Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/year)	Basis for Determination
Criteria Pollutants:							
1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)				0.14	0.63	AP-42
2.)	PM #10 microns in diameter (PE/PM10)				0.14	0.63	AP-42
3.)	PM #2.5 microns in diameter (PE/PM2.5)				0.14	0.63	AP-42
4.)	Sulfur dioxide (SO2)				0.19	0.82	Other
5.)	Nitrogen Oxides (NOx)				2.17	9.5	Other
6.)	Carbon monoxide (CO)				4.51	19.8	Other
7.)	Volatile organic compounds (VOC)				1.48	6.5	Other
8.)	Lead (Pb)				Neg	Neg	
9.)	Total Hazardous Air Pollutants (HAPs)				0.26	1.8	AP-42
10.)	Fluoride (F)				N/A	N/A	
11.)	Hydrogen Sulfide (H2S)				N/A	N/A	
12.)	Mercury (Hg)				N/A	N/A	
13.)	Total Reduced Sulfur (TRS)				N/A	N/A	
14.)	Sulfuric Acid Mist (SAM)				N/A	N/A	

**Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.*

Revised 1/22/2015

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminents

Pollutants:		Pre-Controlled Potential Emissions (tons/year)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/year)	Basis for Determination
1.)	Formaldehyde				0.15	0.65	
2.)	Acetaldehyde				0.11	0.50	
3.)	Acrolein				0.07	0.31	
4.)							
5.)							
6.)							

Greenhouse Gases (GHGs)

Pollutants:		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)							
2.)							
3.)							
4.)							
5.)							
6.)							

Revised 1/22/2015

Control Equipment:

Oxidation Catalyst

Manufacturer: TBD
Date Installed: January 2015
Model Name and Number: TBD
Company Control Equipment ID:
Company Control Equipment Description: Oxidation catalyst with AFRC

Pollutant(s) Controlled:

☑ CO	☐ NOx	☐ Pb	☐ SO2	☑ VOC	☐ PM	
☐ PM (FIL)	☐ PM Condensible	☐ PM 10 (FIL)	☐ PM 2.5 (FIL)	☐ PM 10	☐ PM 2.5	
☐ Other						

NOTE: The following fields require numeric values unless otherwise denoted with an asterisk*

Design Control Efficiency (%):
Capture Efficiency (%):
Operating Control Efficiency (%):
Catalyst Type:* Oxidation Catalyst
Air Fuel Ratio Controller:* Yes

☑ This is the only control equipment on this air contaminant source

If not, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List all other emission units that are also vented to this control equipment:* N/A

List all release point IDs associated with this control equipment:* E1

Release Point Information:

Complete the table below for ***each*** release point. Please include release point information for each emission unit. Multiple attachments may be necessary. A release point is a point at which emissions from an emission unit are released into the ambient (outside)air. List each individual release point on a separate pair of lines (release point ID and description). ***For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)***

Stack Release Point Information		
Company Release Point ID:	Release Point Type:	Vertical
YP 4-12	Release Point Latitude:	42.42305
E1-stack	Release Point Longitude:	-109.76083
Company Release Point Description:	Base Elevation (ft):	7127
YP 4-12	Stack Height (ft):	21.4
Compressor engine exhaust stack	Stack Diameter (ft):	1.00
	Exit Gas Velocity (ft/s):	135.4
	Exit Gas Temp (F):	986
	Exit Gas Flow Rate (acfm):	6,382
Company Release Point ID:	Release Point Type:	
	Release Point Latitude:	
	Release Point Longitude:	
Company Release Point Description:	Base Elevation (ft):	
	Stack Height (ft):	
	Stack Diameter (ft):	
	Exit Gas Velocity (ft/s):	
	Exit Gas Temp (F):	
	Exit Gas Flow Rate (acfm):	
Company Release Point ID:	Release Point Type:	
	Release Point Latitude:	
	Release Point Longitude:	
Company Release Point Description:	Base Elevation (ft):	
	Stack Height (ft):	
	Stack Diameter (ft):	
	Exit Gas Velocity (ft/s):	
	Exit Gas Temp (F):	
	Exit Gas Flow Rate (acfm):	
Company Release Point ID:	Release Point Type:	
	Release Point Latitude:	
	Release Point Longitude:	
Company Release Point Description:	Base Elevation (ft):	
	Stack Height (ft):	
	Stack Diameter (ft):	
	Exit Gas Velocity (ft/s):	
	Exit Gas Temp (F):	
	Exit Gas Flow Rate (acfm):	

ATTACHMENT B

SUPPORTING EMISSION CALCULATIONS

Summary of Critiera Pollutant Emissions
Jonah Energy LLC
YP 4-12 Compressor Engine

Unit ID	Source	NOx		CO		VOC		SO2		PM10 / PM2.5	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
wv-16956-1	Natural gas-fired compressor engine, 1340 HP	2.07	9.06	4.43	19.41	1.48	6.47	0.17	0.76	0.14	0.60
H1	Natural gas-fired separator heater #1, 0.5 MMBtu/hr	0.05	0.21	0.04	0.18	0.003	0.01	0.01	0.03	0.004	0.02
H2	Natural gas-fired separator heater #2, 0.5 MMBtu/hr	0.05	0.21	0.04	0.18	0.003	0.01	0.01	0.03	0.004	0.02
	Totals	**2.17**	**9.5**	**4.51**	**19.8**	**1.48**	**6.5**	**0.19**	**0.82**	**0.14**	**0.63**

Notes:
(1) Engine and heater emissions are based upon a maximum of 8760 operating hours

CALCULATIONS AND COMPUTATIONS

Emission Source:	Compressor Engine	
Source Type:	Natural Gas-Fired RICE - Lean Burn	
Site-Rated Horsepower (HP)	1340	Max Permitted Horsepower
Maximum Fuel Usage (Btu/bhp-hr)	10182	Manf Spec Sheet, HHV
Number of Units:	1	
Natural Gas Heating Value (BTU/scf)	1120	Analysis Data
Sulfur Content of Fuel (grains/scf):	0.05	Estimated
Operating Hours per Year:	**8760**	

One (1) Compressor Engine

Compound	Emission Factor (a)	Emission Rate	
		Hourly (b) (Lbs/Hr)	Annual (c) (Tons/Year)
NOx	0.7	2.07	9.06
CO	1.5	4.43	19.41
VOC	0.5	1.48	6.47
HCHO	0.05	0.15	0.65
SO2	0.013	0.17	0.76
PM-10 - total	0.01	0.14	0.60

Notes:

(a) Emission factors for NOx, CO, VOC and HCHO (g/hp-hr) based upon proposed WDEQ BACT limits
Emission factor for SO2 (lb/MMBtu) based maximum estimated sulfur content of natural gas of 5 grains/100 scf
PM10 emission factor (lb/MMBtu) from USEPA AP-42, Chapter 3.2, Table 3.2-2 (4SLB), dated July 2000.
PM10 emission factor includes PM10 filterable and PM condensable

(b) Hourly Emission Rate (Lbs/Hr) = (Emission Factor, g/hp-hr) * (Horsepower, HP) / 453.6
Hourly Emission Rate (Lbs/Hr) = (Emission Factor, lb/MMBtu) * (Horsepower, HP) * (Fuel Consumption, Btu/bhp-hr) / 1,000,000

(c) Annual Emission Rate (Tons/Yr) = (Hourly Emission Rate, Lbs/Hr) * (Hour of Operation Per Year, Hr/Yr) / (2,000 Lbs/Ton)

CALCULATIONS AND COMPUTATIONS

Emission Source:	Separator Heaters	
Source Type:	Natural Gas-Fired Heaters	
Heat Input (mmBtu/hr):	0.50	Permitted heat input
Number of Units:	2	
Natural Gas Consumption (MMscf/yr)	3.9	calculated; one heater
Natural Gas Consumption (MMscf/yr)	7.8	calculated; 2 heaters
Natural Gas Heating Value (BTU/scf)	1120	Analysis Data
Sulfur Content of Fuel (grains/scf):	0.05	Estimated
Operating Hours per Year:	**8760**	

One Separator Heater

Compound	Emission Factor (a)	Emission Rate Hourly (b) (Lbs/Hr)	Emission Rate Annual (c) (Tons/Year)
NOx	100	0.05	0.21
CO	84	0.04	0.18
VOC	5.5	0.003	0.01
SO2	1.27E-02	0.01	0.03
PM-10	7.60	0.004	0.02

Two Separator Heaters

Compound	Emission Factor (a)	Emission Rate Hourly (b) (Lbs/Hr)	Emission Rate Annual (c) (Tons/Year)
NOx	100	0.10	0.43
CO	84	0.08	0.36
VOC	5.5	0.01	0.02
SO2	1.27E-02	0.01	0.06
PM-10	7.60	0.01	0.03

Notes:

(a) Emission factors (lb/MMscf) based on USEPA AP-42, Chapter 1.4, Tables 1.4-1 and 1.4-2, dated July 1998, except for SO2 Emission factor for SO2 (lb/MMBtu) based assumed sulfur content of natural gas

(b) Hourly Emission Rate (Lbs/Hr) except for SO2 = (Emission Factor, lb/MMscf) * (Heat Input, MMBtu/hr) * (Actual Natural Gas Heating Value, Btu/scf) / (AP-42 Natural Gas Heating Value, Btu/scf) / (AP-42 Natural Gas Heating Value, Btu/scf)

(b) Hourly Emission Rate (Lbs/Hr) for SO2 = (Emission Factor, Lb/MMBtu) * (Heat Input, MMBtu/hr)

(c) Annual Emission Rate (Tons/Yr) = (Hourly Emission Rate, Lbs/Hr) * (Hour of Operation Per Year, Hr/Yr) / (2,000 Lbs/Ton)

Calculations and Computations

Pollutant	Type[a]	Emission Factor AP-42 Section 3.2, 7/00 - Natural Gas-Fired Reciprocating Engines - Lean Burn (g/bhp-hr)	(lb/MMBtu)[d]	Rating	Natural Gas Combustion: Maximum Heat Input, one engine (MMBtu/Hr)[b]	Average Heat Input, one engine (MMBtu/Hr)[c]	Natural Gas-Fired Compressor Engine Emissions: Emission Rate, One Engine Hourly[e] (lb/hr)	Annual (lbs/yr)	Annual[f] (tpy)	Emission Rate, One Engines Hourly[e] (lb/hr)	Annual[f] (tpy)	Major (Y/N)
1,1,2,2-Tetrachloroethane	HAP		4.00E-05	E	13.64	13.64	5.46E-04	4.8	2.39E-03	5.46E-04	2.39E-03	No
1,1,2-Trichloroethane	HAP		3.18E-05	E	13.64	13.64	4.34E-04	3.8	1.90E-03	4.34E-04	1.90E-03	No
1.3-Butadiene	HAP		2.67E-04	D	13.64	13.64	3.64E-03	31.9	1.60E-02	3.64E-03	1.60E-02	No
1,3-Dichloropropene	HAP		2.64E-05	E	13.64	13.64	3.60E-04	3.2	1.58E-03	3.60E-04	1.58E-03	No
2-Methylnaphthalene	HAP		3.32E-05	C	13.64	13.64	4.53E-04	4.0	1.98E-03	4.53E-04	1.98E-03	No
2,2,4-Trimethylpentane	HAP		2.50E-04	C	13.64	13.64	3.41E-03	29.9	1.49E-02	3.41E-03	1.49E-02	No
Acenaphthene	HAP		1.25E-06	C	13.64	13.64	1.71E-05	0.1	7.47E-05	1.71E-05	7.47E-05	No
Acenaphthylene	HAP		5.53E-06	C	13.64	13.64	7.55E-05	0.7	3.30E-04	7.55E-05	3.30E-04	No
Acetaldehyde	HAP		8.36E-03	A	13.64	13.64	1.14E-01	999.2	5.00E-01	1.14E-01	5.00E-01	No
Acrolein	HAP		5.14E-03	A	13.64	13.64	7.01E-02	614.3	3.07E-01	7.01E-02	3.07E-01	No
Benzene	HAP		4.40E-04	A	13.64	13.64	6.00E-03	52.6	2.63E-02	6.00E-03	2.63E-02	No
Benzo(b)fluoranthene	HAP		1.66E-07	D	13.64	13.64	2.26E-06	0.0	9.92E-06	2.26E-06	9.92E-06	No
Benzo(e)pyrene	HAP		4.15E-07	D	13.64	13.64	5.66E-06	0.0	2.48E-05	5.66E-06	2.48E-05	No
Benzo(g,h,i)perylene	HAP		4.14E-07	D	13.64	13.64	5.65E-06	0.0	2.47E-05	5.65E-06	2.47E-05	No
Biphenyl	HAP		2.12E-04	D	13.64	13.64	2.89E-03	25.3	1.27E-02	2.89E-03	1.27E-02	No
Carbon Tetrachloride	HAP		3.67E-05	E	13.64	13.64	5.01E-04	4.4	2.19E-03	5.01E-04	2.19E-03	No
Chlorobenzene	HAP		3.04E-05	E	13.64	13.64	4.15E-04	3.6	1.82E-03	4.15E-04	1.82E-03	No
Chloroform	HAP		2.85E-05	E	13.64	13.64	3.89E-04	3.4	1.70E-03	3.89E-04	1.70E-03	No
Chrysene	HAP		6.93E-07	C	13.64	13.64	9.46E-06	0.1	4.14E-05	9.46E-06	4.14E-05	No
Ethylbenzene	HAP		3.97E-05	B	13.64	13.64	5.42E-04	4.7	2.37E-03	5.42E-04	2.37E-03	No
Ethylene Dibromide	HAP		4.43E-05	E	13.64	13.64	6.04E-04	5.3	2.65E-03	6.04E-04	2.65E-03	No
Fluoranthene	HAP		1.11E-06	C	13.64	13.64	1.51E-05	0.1	6.63E-05	1.51E-05	6.63E-05	No
Fluorene	HAP		5.67E-06	C	13.64	13.64	7.74E-05	0.7	3.39E-04	7.74E-05	3.39E-04	No
Formaldehyde	HAP	0.05			13.64	13.64	0.00E+00	1293.9	6.47E-01	1.48E-01	6.47E-01	No
Methanol	HAP		2.50E-03	B	13.64	13.64	3.41E-02	298.8	1.49E-01	3.41E-02	1.49E-01	No
Methylene Chloride	HAP		2.00E-05	C	13.64	13.64	2.73E-04	2.4	1.20E-03	2.73E-04	1.20E-03	No
n-Hexane	HAP		1.11E-03	C	13.64	13.64	1.51E-02	132.7	6.63E-02	1.51E-02	6.63E-02	No
Naphthalene	HAP		7.44E-05	C	13.64	13.64	1.02E-03	8.9	4.45E-03	1.02E-03	4.45E-03	No
PAH	HAP		2.69E-05	D	13.64	13.64	3.67E-04	3.2	1.61E-03	3.67E-04	1.61E-03	No
Phenanthrene	HAP		1.04E-05	D	13.64	13.64	1.42E-04	1.2	6.22E-04	1.42E-04	6.22E-04	No
Pyrene	HAP		1.36E-06	C	13.64	13.64	1.86E-05	0.2	8.13E-05	1.86E-05	8.13E-05	No
Styrene	HAP		2.36E-05	E	13.64	13.64	3.22E-04	2.8	1.41E-03	3.22E-04	1.41E-03	No
Tetrachloroethane	HAP		2.48E-06	D	13.64	13.64	3.38E-05	0.3	1.48E-04	3.38E-05	1.48E-04	No
Toluene	HAP		4.08E-04	B	13.64	13.64	5.57E-03	48.8	2.44E-02	5.57E-03	2.44E-02	No
Vinyl Chloride	HAP		1.49E-05	C	13.64	13.64	2.03E-04	1.8	8.90E-04	2.03E-04	8.90E-04	No
Xylene	HAP		1.84E-04	B	13.64	13.64	2.51E-03	22.0	1.10E-02	2.51E-03	1.10E-02	No
							0.26	3609.2				
Hours of Operation		8,760 hours/yr										
Number of Engines		1										
Horsepower		1,340 HP										
Fuel Consumption		10,182 Btu/bhp-hr										
Heat Input		13.64 MMBtu/hr										
							Compressor Engine Total HAPs		1.80		1.80	No
							Maximum Individual HAP		0.65		0.65	No
NSCR Control Efficiency =		0.0% Assume 0% for calcs										

Notes:

(a) Type = HAP for Hazardous Air Pollutant.

(b) Maximum heat input rate for the temporary compressor engine is based on calculated heat input rate of 13.64 MMBtu/hr

(c) Assume average heat input rate is the same as maximum heat input rate.

(d) Emission factors from AP-42, Section 3.2, Tables 3.2-2 for 4SLB engines except formaldehyde. Formaldehyde factor based on WDEQ BACT

(e) Hourly Emission Rate (lb/hr) = [Heat Input Rate (MMBtu/Hr) * Emission Factor (lb/MMBtu)]

(f) Annual Emission Rate (tpy) = (Average Hourly Emission Rate, lb/hr) * (8760 hr/yr) / (2,000 lb/ton)

GE Oil & Gas - HSR Compressor Performance Report

Project Name:
Customer/End -user:
Packager:
Site Location: unknown

GE ID#: 140821-141223-TV5
Case #: 5
Version: 02.02.00
Date: 1/15/2015, 5:24:34 PM

Application Data:	Compressor Frame: FS504	Driver Data:	Site Data:
Est. Flow:: 10.000 MMscfd	Rated Power: 4800.0 HP	Type: Engine	Elevation: 7200.0 ft
Load/Flow: 27.3 HP/MMscfd	Stroke: 5.000 in	Manufacturer: Caterpillar	Atm. Pressure: 11.2914 psiA
Est. Total Load: 273.4 HP (34%)	Rated Speed: 1500	Model: G3516LE - AFRC	Ambient Temp: 100.0 deg F
Run Speed: 1150	Rod Diameter: 2.500 in	Rated Power: 1340.0 HP	Gas Method: Generic
Auxiliary Load: 134.0 HP(d)	Max Rod Load Comp: 60000 lbf	Rated Speed: 1400	Base Conditions for Flow Rates:
Lubrication: Lubed	Max Rod Load Tens: 57000 lbf	Avail. Power: 806.8 HP	Pressure: 14.6960 psiA
Type: Gas Gathering	Max Rod Load Gas: 65000 lbf	Amb. Derate: Fixed	Temperature: 60.0 deg F

ISSUES: ***GE must approve BlowThru modes, (No Performance Guarantee at this point.),***
Project Notes: No Gas Analysis Entered,
Case Notes: Ps - 130 / Pd - 180
Order Status:

Stage/Service Data:

		Stage-1
Flow Rate:	MMscfd	10.00
Load:	HP	224.1
Specific Gravity:	-	0.6500
K Value (Cp/Cv):	-	1.2400
Zs:	-	0.9815
Zd:	-	0.9798
Suction Press.:	psiG	130.00
Ps@Flange:	psiG	130.00
Pd@Flange:	psiG	180.00
Discharge Press.:	psiG	180.00
Compress. Ratio:	-	1.3539
Suction Temp.:	deg F	80.0
Cooler Temp.:	deg F	n/a

Cylinder Data:

		Throw-1	Throw-2	Throw-3	Throw-4	Throw-5	Throw-6
Model:	-	06 Series	06 Series	06 Series	06 Series		
Operating Mode:	-	D/A Cyl	BLOW-THRU	D/A Cyl	BLOW-THRU		
Head End	Stage	Stg-1	Stg-1	Stg-1	Stg-1	-	-
Bore:	in	9.5	15	9.5	15	-	-
MAWP:	psiG	1800	635	1800	635	-	-
RDP:	psiG	1636	577	1636	577	-	-
Tail Rod Dia:	in	0	0	0	0	-	-
Est. Td:	deg F	120.6	n/a	120.6	n/a	-	-
VVCP Open:	in : Turns	12.88 : 103	10.20 : 82	12.88 : 103	10.20 : 82	-	-
Base Clr:	%	24.49	n/a	24.49	n/a	-	-
Added Clr:	%	57.83	n/a	57.83	n/a	-	-
Total Clr:	%	82.32	n/a	82.32	n/a	-	-
Vol. Eff. Suct.:	%	73.61	n/a	73.61	n/a	-	-
Vol. Eff. Disch.:	%	57.55	n/a	57.55	n/a	-	-
Flow:	MMscfd	2.34	n/a	2.34	n/a	-	-
Crank End	Stage	Stg-1	Stg-1	Stg-1	Stg-1	-	-
Bore:	in	9.5	15	9.5	15	-	-
MAWP:	psiG	1800	635	1800	635	-	-
RDP:	psiG	1636	577	1636	577	-	-
Est. Td:	deg F	120.6	n/a	120.6	n/a	-	-
Base Clr:	%	22.44	n/a	22.44	n/a	-	-
Added Clr:	%	0.00	n/a	0.00	n/a	-	-
Total Clr:	%	22.44	n/a	22.44	n/a	-	-
Vol. Eff. Suct.:	%	89.58	n/a	89.58	n/a	-	-
Vol. Eff. Disch.:	%	70.04	n/a	70.04	n/a	-	-
Flow:	MMscfd	2.66	n/a	2.66	n/a	-	-
Valve Spacers:	HE#/CE#	0 / 0	0 / 0	0 / 0	0 / 0	-	-
Rod Loads							
Gas-Compress.:	%	10.3	1.1	10.3	1.1	-	-
Gas-Tension:	%	7.8	-0.8	7.8	-0.8	-	-
Net-Compress.:	%	46.9	51.0	46.9	51.0	-	-
Net-Tension:	%	62.1	68.4	62.1	68.4	-	-
Pin Reversal:	Deg/Mag%	162/79	162/78	162/79	162/78	-	-
Throw Loading	HP	111.1	1.0	111.1	1.0	-	-

BOLD = Out of Limit FILE: Jonah compressor updated low pressure conditions.hsr

GE Oil & Gas - HSR Compressor Performance Report

Project Name:
Customer/End -user:
Packager:
Site Location: unknown

GE ID#: 140821-141223-TV5
Case #: 6
Version: 02.02.00
Date: 1/15/2015, 5:24:35 PM

Application Data:	Compressor Frame: FS504	Driver Data:	Site Data:
Est. Flow:: 10.001 MMscfd	Rated Power: 4800.0 HP	Type: Engine	Elevation: 7200.0 ft
Load/Flow: 32.5 HP/MMscfd	Stroke: 5.000 in	Manufacturer: Caterpillar	Atm. Pressure: 11.2914 psiA
Est. Total Load: 324.6 HP (40%)	Rated Speed: 1500	Model: G3516LE - AFRC	Ambient Temp: 100.0 deg F
Run Speed: 1150	Rod Diameter: 2.500 in	Rated Power: 1340.0 HP	Gas Method: Generic
Auxiliary Load: 134.0 HP(d)	Max Rod Load Comp: 60000 lbf	Rated Speed: 1400	Base Conditions for Flow Rates:
Lubrication: Lubed	Max Rod Load Tens: 57000 lbf	Avail. Power: 806.8 HP	Pressure: 14.6960 psiA
Type: Gas Gathering	Max Rod Load Gas: 65000 lbf	Amb. Derate: Fixed	Temperature: 60.0 deg F

ISSUES: ***GE must approve BlowThru modes, (No Performance Guarantee at this point.),***
Project Notes: No Gas Analysis Entered,
Case Notes: Ps - 130 / Pd - 200
Order Status:

Stage/Service Data:

		Stage-1
Flow Rate:	MMscfd	10.00
Load:	HP	275.3
Specific Gravity:	-	0.6500
K Value (Cp/Cv):	-	1.2400
Zs:	-	0.9815
Zd:	-	0.9793
Suction Press.:	psiG	130.00
Ps@Flange:	psiG	130.00
Pd@Flange:	psiG	200.00
Discharge Press.:	psiG	200.00
Compress. Ratio:	-	1.4954
Suction Temp.:	deg F	80.0
Cooler Temp.:	deg F	n/a

Cylinder Data:

		Throw-1	Throw-2	Throw-3	Throw-4	Throw-5	Throw-6
Model:	-	06 Series	06 Series	06 Series	06 Series		
Operating Mode:	-	D/A Cyl	BLOW-THRU	D/A Cyl	BLOW-THRU		
Head End	Stage	Stg-1	Stg-1	Stg-1	Stg-1	-	-
Bore:	in	9.5	15	9.5	15	-	-
MAWP:	psiG	1800	635	1800	635	-	-
RDP:	psiG	1636	577	1636	577	-	-
Tail Rod Dia:	in	0	0	0	0	-	-
Est. Td:	deg F	131.8	n/a	131.8	n/a	-	-
VVCP Open:	in : Turns	6.21 : 50	6.21 : 50	6.21 : 50	6.21 : 50	-	-
Base Clr:	%	24.49	n/a	24.49	n/a	-	-
Added Clr:	%	27.90	n/a	27.90	n/a	-	-
Total Clr:	%	52.39	n/a	52.39	n/a	-	-
Vol. Eff. Suct.:	%	75.99	n/a	75.99	n/a	-	-
Vol. Eff. Disch.:	%	54.81	n/a	54.81	n/a	-	-
Flow:	MMscfd	2.42	n/a	2.42	n/a	-	-
Crank End	Stage	Stg-1	Stg-1	Stg-1	Stg-1	-	-
Bore:	in	9.5	15	9.5	15	-	-
MAWP:	psiG	1800	635	1800	635	-	-
RDP:	psiG	1636	577	1636	577	-	-
Est. Td:	deg F	131.8	n/a	131.8	n/a	-	-
Base Clr:	%	22.44	n/a	22.44	n/a	-	-
Added Clr:	%	0.00	n/a	0.00	n/a	-	-
Total Clr:	%	22.44	n/a	22.44	n/a	-	-
Vol. Eff. Suct.:	%	87.02	n/a	87.02	n/a	-	-
Vol. Eff. Disch.:	%	62.76	n/a	62.76	n/a	-	-
Flow:	MMscfd	2.58	n/a	2.58	n/a	-	-
Valve Spacers:	HE#/CE#	0 / 0	0 / 0	0 / 0	0 / 0	-	-
Rod Loads							
Gas-Compress.:	%	12.7	1.1	12.7	1.1	-	-
Gas-Tension:	%	10.0	-0.8	10.0	-0.8	-	-
Net-Compress.:	%	45.7	51.0	45.7	51.0	-	-
Net-Tension:	%	59.7	68.4	59.7	68.4	-	-
Pin Reversal:	Deg/Mag%	162/81	162/78	162/81	162/78	-	-
Throw Loading	HP	136.7	1.0	136.7	1.0	-	-

BOLD = Out of Limit FILE: Jonah compressor updated low pressure conditions.hsr

G3516

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
Jonah Energy- Pilot

CATERPILLAR®

ENGINE SPEED (rpm):	1400	RATING STRATEGY:	LOW NOX UPGRADE
COMPRESSION RATIO:	8:1	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	HPG IMPCO WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 2 INLET (°F):	130		
AFTERCOOLER - STAGE 1 INLET (°F):	201	SITE CONDITIONS:	
JACKET WATER OUTLET (°F):	210	FUEL:	Field Gas
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig):	40.0-45.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	62.2
CONTROL SYSTEM:	ADEM3	FUEL LHV (Btu/scf):	1027
EXHAUST MANIFOLD:	ASWC	ALTITUDE(ft):	7200
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	100
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	1340 bhp@1400rpm
SET POINT TIMING:	28		

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**60%**
ENGINE POWER	(WITHOUT FAN)	(1)	bhp	1340	1117	838	670
INLET AIR TEMPERATURE			°F	45	100	100	100
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(2)	Btu/bhp-hr	8505	8741	9042	9215
FUEL CONSUMPTION (HHV)		(2)	Btu/bhp-hr	9398	9658	9992	10182
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(3)(4)	ft3/min	3100	2928	2235	1797
AIR FLOW	(WET)	(3)(4)	lb/hr	14624	12450	9503	7640
FUEL FLOW (60°F, 14.7 psia)			scfm	185	158	123	100
INLET MANIFOLD PRESSURE		(5)	in Hg(abs)	76.2	67.0	52.6	42.8
EXHAUST TEMPERATURE - ENGINE OUTLET		(6)	°F	983	986	989	989
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(7)(4)	ft3/min	9555	8156	6245	5023
EXHAUST GAS MASS FLOW	(WET)	(7)(4)	lb/hr	15173	12920	9868	7937
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(8)(9)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(8)(9)	g/bhp-hr	3.84	3.85	3.82	3.77
THC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	3.81	4.06	4.30	4.39
NMHC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	0.99	1.05	1.11	1.14
NMNEHC (VOCs) (mol. wt. of 15.84)		(8)(9)(10)	g/bhp-hr	0.66	0.71	0.75	0.77
HCHO (Formaldehyde)		(8)(9)	g/bhp-hr	0.24	0.40	0.50	0.51
CO2		(8)(9)	g/bhp-hr	575	587	601	607
EXHAUST OXYGEN		(8)(11)	% DRY	8.3	8.2	8.0	7.8
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(12)	Btu/min	43498	39681	33723	29024
HEAT REJ. TO ATMOSPHERE		(12)	Btu/min	5313	4726	3987	3543
HEAT REJ. TO LUBE OIL (OC)		(12)	Btu/min	6487	5918	5029	4329
HEAT REJ. TO A/C - STAGE 1 (1AC)		(12)(13)	Btu/min	14756	14756	5145	2566
HEAT REJ. TO A/C - STAGE 2 (2AC)		(12)(13)	Btu/min	4829	4829	3121	2507

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(13)(14)	Btu/min	71125
TOTAL AFTERCOOLER CIRCUIT (2AC)	(13)(14)	Btu/min	5071
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

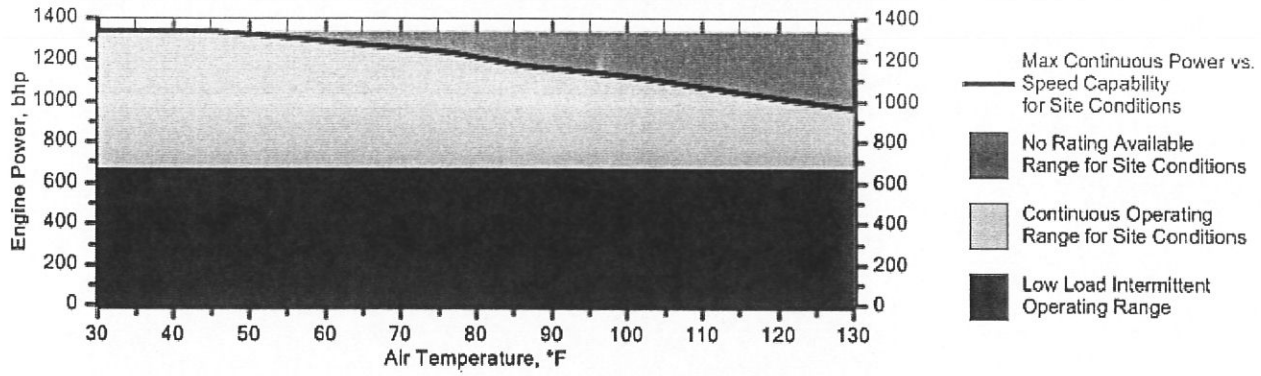
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY: Bob Belkowski, J-W Power Company
Data generated by Gas Engine Rating Pro Version 4.07.01
Ref. Data Set DM9400-01-001, Printed 20Aug2014

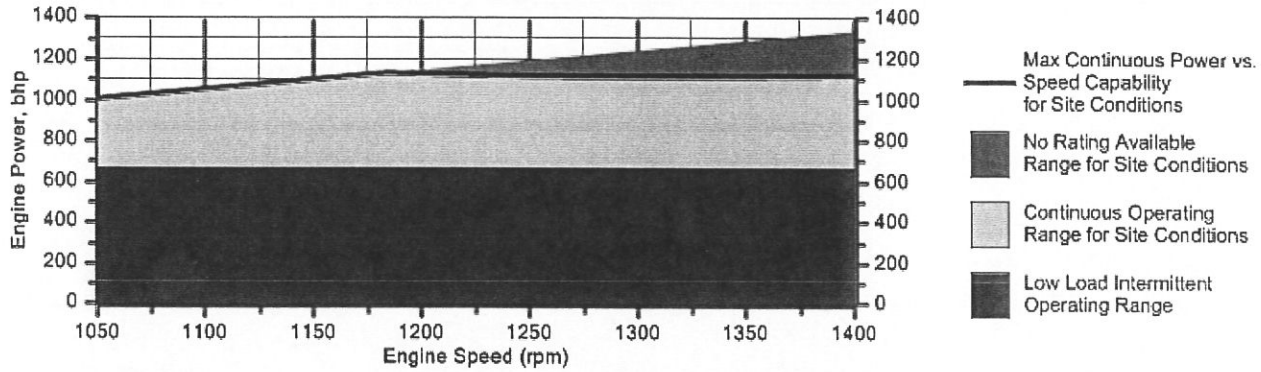
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 7200 ft and 1400 rpm



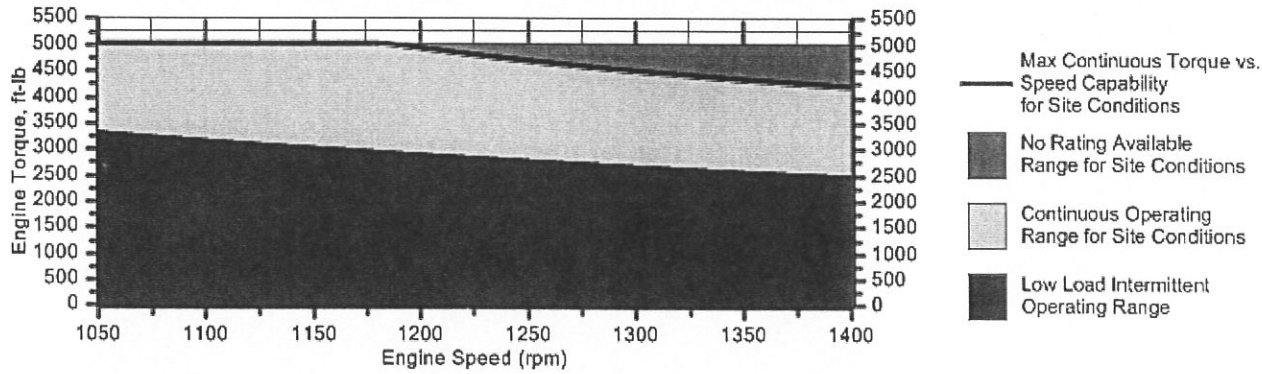
Engine Power vs. Engine Speed

Data represents speed sweep at 7200 ft and 100 °F



Engine Torque vs. Engine Speed

Data represents speed sweep at 7200 ft and 100 °F



Note: At site conditions of 7200 ft and 100°F inlet air temp., constant torque can be maintained down to 1050 rpm. The minimum speed for loading at these conditions is 1050 rpm.

NOTES

1. Engine rating is with two engine driven water pumps. Tolerance is ± 3% of full load.

2. Fuel consumption tolerance is ± 3.0% of full load data.

3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.

4. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.

5. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.

6. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.

7. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of ± 6 %.

8. Emissions data is at engine exhaust flange prior to any after treatment.

9. Emission values are based on engine operating at steady state conditions. Fuel methane number cannot vary more than ± 3. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

10. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ

11. Exhaust Oxygen level is the result of adjusting the engine to operate at the specified NOx level. Tolerance is ± 0.5.

12. Heat rejection values are nominal. Tolerances, based on treated water, are ± 10% for jacket water circuit, ± 50% for radiation, ± 20% for lube oil circuit, and ± 5% for aftercooler circuit.

13. Aftercooler heat rejection includes an aftercooler heat rejection factor for the site elevation and inlet air temperature specified. Aftercooler heat rejection values at part load are for reference only. Do not use part load data for heat exchanger sizing.

14. Cooling system sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	2.5211	2.5211
Methane	CH4	86.6340	86.6340
Ethane	C2H6	4.9767	4.9767
Propane	C3H8	3.5670	3.5670
Isobutane	iso-C4H1O	0.0000	0.0000
Norbutane	nor-C4H1O	1.8211	1.8211
Isopentane	iso-C5H12	0.0000	0.0000
Norpentane	nor-C5H12	0.4802	0.4802
Hexane	C6H14	0.0000	0.0000
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.0000	0.0000
Carbon Dioxide	CO2	0.0000	0.0000
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0000	0.0000
Octane	C8H18	0.0000	0.0000
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0000	100.0000

Fuel Makeup:	Field Gas
Unit of Measure:	English
Calculated Fuel Properties	
Caterpillar Methane Number:	62.2
Lower Heating Value (Btu/scf):	1027
Higher Heating Value (Btu/scf):	1135
WOBBE Index (Btu/scf):	1274
THC: Free Inert Ratio:	Not Applicable
Total % Inerts (% N2, CO2, He):	0%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.997
Stoich A/F Ratio (Vol/Vol):	10.68
Stoich A/F Ratio (Mass/Mass):	16.43
Specific Gravity (Relative to Air):	0.650
Specific Heat Constant (K):	1.297

CONDITIONS AND DEFINITIONS

Caterpillar Methane Number represents the knock resistance of a gaseous fuel. It should be used with the Caterpillar Fuel Usage Guide for the engine and rating to determine the rating for the fuel specified. A Fuel Usage Guide for each rating is included on page 2 of its standard technical data sheet.

RPC always applies to naturally aspirated (NA) engines, and turbocharged (TA or LE) engines only when they are derated for altitude and ambient site conditions.

Project specific technical data sheets generated by the Caterpillar Gas Engine Rating Pro program take the Caterpillar Methane Number and RPC into account when generating a site rating.

Fuel properties for Btu/scf calculations are at 60F and 14.696 psia.

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and related material or any part thereof.

FUEL LIQUIDS

Field gases, well head gases, and associated gases typically contain liquid water and heavy hydrocarbons entrained in the gas. To prevent detonation and severe damage to the engine, hydrocarbon liquids must not be allowed to enter the engine fuel system. To remove liquids, a liquid separator and coalescing filter are recommended, with an automatic drain and collection tank to prevent contamination of the ground in accordance with local codes and standards.

To avoid water condensation in the engine or fuel lines, limit the relative humidity of water in the fuel to 80% at the minimum fuel operating temperature.

ATTACHMENT C

JONAH ENERGY OFFSET BANK SPREADSHEET

SUBLETTE COUNTY PERMITTED EMISSIONS April 1, 2008 - PRESENT

Date of Public Notice	Application Date	Application Number	Company	Facility	PermitNumber	PermitDate	CurrentVOC	CurrentNOx	Base Emissions April 1, 2008 Emissions VOC	Base Emissions April 1, 2008 Emissions NO_X	Previous Permit VOC	Previous Permit NO_X	Delta VOC	Delta NOx	Offset VOC	Offset NOx	Trade VOC for NOx	Comments
	9/16/2008	7855	EnCana	Stud Horse Butte 10-28 CF	MD-7855		23.3	4.6	77.4	2.5	0	0	-54.1	2.1	-54.1	2.1	no	this permit is already issued so no NOx offsets are required
4/17/2008	3/14/2008	7519	EnCana	SAG 34-19	CT-7519	4/1/2009	12.8	0.9	10.6	0.6	0	0	2.2	0.3	2.2	0.3	yes	
1/8/2009	2/13/2008 & 8/13/2008	#200	EnCana	Stud Horse Butte 13-26 CF	MD-8200	4/1/2009	31.8	7.6	16.3	4.1	0	0	15.5	3.5	23.3	3.9	yes	
6/26/2008	5/7/2008	7761	EnCana	Stud Horse Butte 6-28 CF	MD-7761	4/1/2009	14.2	2.2	6.4	1.3	0	0	7.8	0.9	7.8	0.9	yes	
6/12/2008	4/22/2008	7692	EnCana	Stud Horse Butte 7-15 CF	MD-7692	4/1/2009	10.3	3.0	0.5	2.3	0	0	9.8	1.5	9.8	1.5	yes	
9/22/2008	6/17/2008	7905	EnCana	Jonah Workforce Facility	MD-7905	4/22/2009	14.3	11.5	9.2	13			5.1	-1.5	5.1	-1.5		Annual emissions reduction due to employee vehicle traffic of 13.0 tpy NO_X, 60.6 tpy CO, 9.2 tpy VOC, and 196.1 tpy PM.
1/8/2009	6/25/2008	7975	EnCana	Corona - SHB 15-19 CF	MD-7975	4/1/2009	29.3	6.5	81.7	1.7	0	0	-52.4	4.8	-52.4	4.8	yes	addition of 3 existing wells that had no dehy/tank controls and 1 well with no dehy controls
1/8/2009	5/16/2008	7807	EnCana	Stud Horse Butte 32-10	CT-7807	4/1/2009	5.1	1	4.9	1	0	0	0.2	0	0.2	0	no	
1/8/2009	5/21/2008 & 8/5/2008	8176	EnCana	Jonah Federal 11-18 CF	CT-8176	4/1/2009	11.3	2.3	5.3	1.5	0	0	6.0	0.8	9.0	0.9	yes	
1/8/2009	6/18/2008	7924	EnCana	Jonah Federal 1-5 CF	MD-7924	4/1/2009	13.8	3.9	25.4	2.8	0	0	-11.6	1.1	-11.6	1.1	yes	controlling pneumatic pumps
1/8/2009	6/25/2008	7972	EnCana	Jonah Federal 5-4 CF	MD-7972	4/1/2009	28.2	6.3	19.5	2.5	0	0	8.7	3.8	8.7	3.8	yes	
1/8/2009	6/25/2008	7973	EnCana	SOL 9-36	CT-7973	4/1/2009	4.7	1.2	0	0	0	0	4.7	1.2	4.7	1.2	yes	
1/8/2009	6/25/2008	7974	EnCana	Stud Horse Butte 12-36 CF	MD-7974	4/1/2009	20.1	6.1	90.4	3.7	0	0	-62.3	2.4	-62.3	2.5	yes	consolidating wells and controlling previously uncontrolled tanks and dehydration units
1/8/2009	12/5/2007	7003	EnCana	Stud Horse Butte 71-32 CF	MD-7003	4/1/2009	13	3.4	12.3	3.3	0	0	0.7	0.1	0.7	0.1	yes	
1/8/2009	12/27/2007	7162	EnCana	Stud Horse Butte 48-16	CT-7162	4/1/2009	11	0.6	11	0.6	0	0	0	0	0	0	yes	would have a decrease in VOC if pneumatic pumps were controlled (modified prior to 9/1/07 so control is not required)
	12/5/2007	7056	EnCana	Stud Horse Butte 16-26 CF	MD-7056	4/1/2009	16.7	1.6	15.7	1.5	0	0	1.0	0.1	1.0	0.1	yes	would have a decrease in VOC if pneumatic pumps were controlled (modified prior to 9/1/07 so control is not required)
1/8/2009	12/13/2007 & 8/13/2008	8199	EnCana	Yellow Point 8-13 CF	MD-8199	4/1/2009	18.4	3.4	9.2	1.4	0	0	9.2	2	13.8	2.2	yes	
1/8/2009	7/10/2008	8035	EnCana	Corona - SHB 10-31 CF	MD-8035	4/1/2009	29.3	6.8	89.8	4.2	0	0	-60.5	2.6	-60.5	2.6	yes	addition of 3 existing wells that had no dehy or tank controls
8/28/2008	7/29/2008	8095	EnCana	Yellow Point 4-12 CF	MD-8095	9/30/2008	31.9	4.4	219	15.7	0	0	-187.1	-11.3	-187.1	-11.3		consolidation of 29 wells which decreases the number of dehydration units / tanks now controlled at 2 of the existing wells / pneumatic pumps now controlled
1/8/2009	7/23/2008	8104	EnCana	Stud Horse Butte 4-27 CF	MD-8104	4/1/2009	22.6	4.5	34.7	1.5	0	0	-12.1	3	-12.1	3	yes	adding well to CF that has no dehy controls
1/8/2009	7/28/2008	8109	EnCana	Corona 3-31 CF	MD-8109	4/1/2009	20.1	3.6	20.9	1	0	0	-0.8	2.6	-0.8	2.6	yes	
1/8/2009	7/28/2008	8110	EnCana	Stud Horse Butte 11-26 CF	MD-8110	4/1/2009	35.1	8.8	18.2	2.1	0	0	16.9	6.7	16.9	6.7	yes	
1/8/2009	8/15/2008	8202	EnCana	Stud Horse Butte 11-17 CF	MD-8202	4/1/2009	30.5	6.1	57.1	1.7	0	0	-26.6	4.4	-26.6	4.8	yes	decrease due to consolidation of previously uncontrolled equipment
	9/18/2008	8132	EnCana	Section 32 Methanol Tank	wv-8132	9/18/2008	0.3	0	0	0	0	0	0.3	0	0.3	0		
1/8/2009	9/4/2008	8326	EnCana	Jonah Federal 1-6 CF	MD-8326	4/1/2009	22.7	5.2	45.6	3.4	0	0	-22.9	1.8	-22.9	2	yes	decrease due to consolidation of previously uncontrolled equipment
1/8/2009	9/15/2008	8357	EnCana	Yellow Point 2-1 CF	MD-8357	4/1/2009	23	4.9	25	2.5	0	0	-2	2.4	-2	2.6	yes	controlling pneumatic pumps
1/8/2009	9/15/2008	8358	EnCana	Stud Horse Butte 10-33 CF	MD-8358	4/1/2009	10.1	4.4	22.3	5.4	0	0	-4.2	-1	-4.2	-1		controlling pneumatic pumps / less heaters
1/8/2009	10/15/2008	8409	EnCana	SOL 2-2 CF	CT-8409	4/1/2009	4.3	0.9	0	0	0	0	4.3	0.9	6.5	1	yes	
NA	8/13/2008	7164	EnCana	Yellow Point 1-13 CF	MD-7164	7/1/2008	22.4	4.5	11.6	2.5	0	0	10.8	2	16.2	2.2	yes	short form application
NA	8/13/2008	7438	EnCana	Stud Horse Butte 16-34R CF	MD-7438	5/22/2008	19.4	4	7.7	1.5	0	0	11.7	2.5	17.8	2.8	yes	short form application
NA	8/13/2008	6758	EnCana	Stud Horse Butte 4-26 CF	MD-6758	5/22/2008	36.1	8.2	22	2.6	0	0	14.1	5.6	21.2	6.2	yes	short form application
NA	9/25/2008	7055	EnCana	Stud Horse Butte 7-26 CF	MD-7055	5/20/2008	38.1	8.6	14	3.4	0	0	24.1	5.2	36.2	5.7	yes	short form application
1/8/2009	10/2/2008	8440	EnCana	Corona-SHB 10-30 CF	MD-8440	4/1/2009	27.3	8.3	77.5	2.6	0	0	-50.2	5.7	-50.2	6.3	yes	consolidating wells and controlling previously uncontrolled tanks and dehydration units
1/8/2009	10/2/2008	8441	EnCana	Stud Horse Butte 11-36 CF	MD-8441	4/1/2009	10.5	4.1	62.5	1.6	0	0	-44	2.5	-44.0	2.8	yes	consolidating wells and controlling previously uncontrolled tanks and dehydration units
1/8/2009	10/7/2008	8458	EnCana	Jonah Federal 1-8 CF	MD-8458	4/1/2009	14.4	2.9	23.9	0.3	0	0	-9.5	2.6	-9.5	2.9	yes	controlling previously uncontrolled well
1/8/2009	10/8/2008	8467	EnCana	Stud Horse Butte 7-36 CF	MD-8467	4/1/2009	15.7	2.9	43.8	0.9	0	0	-28.1	2	-28.1	2.2	yes	consolidating wells and controlling previously uncontrolled tanks and dehydration units
1/8/2009	10/15/2008	8490	EnCana	Stud Horse Butte 11-20 CF	MD-8490	4/1/2009	35.6	8.9	144.4	7.1	0	0	-108.8	1.8	-108.8	2.0	yes	consolidating wells and controlling previously uncontrolled tanks and dehydration units
1/8/2009	10/16/2008	8498	EnCana	Stud Horse Butte 16-18 CF	MD-8498	4/1/2009	9.4	2.6	20	0.4	0	0	-10.6	2.2	-10.6	2.4	yes	controlling previously uncontrolled dehy/tank emissions
1/8/2009	10/28/2008	8566	EnCana	Stud Horse Butte 122-10 CF	MD-8566	4/1/2009	18.2	3.7	16.4	0.4	0	0	1.8	3.3	2.7	3.6	yes	
1/8/2009	11/12/2008	8620	EnCana	Yellow Point 16-13 CF	CT-8620	4/1/2009	11.6	2.8	0	0	0	0	11.6	2.8	17.4	3.1	yes	
NA	4/1/2008	7561	EnCana	Jonah Office Building	wv-7561	10/27/2008	1.5	1	0	0	0.4	1.1	1.1	-0.1	1.1	-0.1	no	new facility, relinquishing authority to operate engines authorized under waivers AP-4396 and AP-4397
NA	3/10/2009	4633A	EnCana	Section 36 Water Disposal	CT-4633A	3/30/2009	1.1	2.7	0.0	0.0	1.1	2.7	0.0	0.0	0.0	0.0	no	Engine Swap
NA						4/1/2009									76.9	-76.9		Recognize offset trading VOC for Nox
NA	2/20/2009	9058	EnCana	Stud Horse Butte 13-26 CF	MD-8200	4/29/2009	31.8	7.6	0.0	0.0	31.8	7.6	0.0	0.0	0.0	0.0	NA	short form application no change in emisson from AP-8200
NA	3/4/2009	9094	EnCana	Corona-SHB 10-31 CF	MD-8035	10/26/2009	33.5	7.1	0.0	0.0	29.3	6.8	4.2	0.3	6.3	0.3	NA	Short Form
N/A	3/19/2009	9181	EnCana	Corona Stud Horse Butte 10-30	MD-8440	4/30/2009	27.3	8.3	0.0	0.0	27.3	8.3	0.0	0.0	0.0	0.0	NA	short form application no change in emisson from AP-8440
NA	4/1/2009	9257	EnCana	SOL 9-36	CT-7973	10/26/2009	7.8	2.0	0.0	0.0	4.7	1.2	3.1	0.8	4.7	0.9	NA	Short Form
	5/22/2009	9450	EnCana	Stud Horse Butte 3-27 CF	MD-7696	10/26/2009	24.9	4.8	104.5	2.0	0	0	-79.6	2.8	-79.6	3.1	NA	
NA	7/1/2009	9655	EnCana	Stud Horse Butte 11-17 CF	MD-8202	10/26/2009	30.5	6.2	0.0	0.0	30.5	6.1	0.0	0.1	0.0	0.1	NA	Short Form
NA	7/30/2009	9730	EnCana	Stud Horse Butte 15-19 CF	MD-7975	8/24/2009	11.0	2.6	0.0	0.0	29.3	6.5	-18.3	-3.9	-18.3	-3.9	NA	Permitting Actual Production instead of PTE- Short Form
NA	8/10/2009	9772	EnCana	Yellow Point 1-13 CF	MD-7164	8/24/2009	8.4	2.2	0.0	0.0	22.4	4.5	-14.0	-2.3	-14.0	-2.3	NA	Short Form Application- Permitting at Actual production instead of PTE
NA	8/20/2009	9800	EnCana	Stud Horse Butte 4-26 CF	MD-6758	10/26/2009	27.5	8.9	0.0	0.0	36.1	8.2	-8.6	0.7	-8.6	0.8	NA	Short Form Application- Permitting at Actual instead of PTE
9/25/2009	9/17/2009	8122	EnCana	Drill Rig Fleet	CT-8122	1/4/2010	79.0	282.0	97.1	457.1	0	0	-18.1	-175.1	-18.1	-175.1	NA	Drill Rig Fleet
10/2/2009	11/17/2008	8649	EnCana	Holmes State 1-36	CT-8649	1/19/2010	2.2	0.5	0.0	0.0	0.0	0.0	2.2	0.5	3.3	0.6	NA	
10/2/2009	11/26/2008	8691	EnCana	Cabrito 7-30 CF	MD-8691	1/19/2010	18.3	3.9	19.0	1.5	0.0	0.0	-0.7	2.4	-0.7	2.6	NA	Controlling Pneumatic pumps that did not require controls as of April 1, 2008
10/2/2009	11/26/2008	8692	EnCana	Yellow Point 1-12 CF	MD-8692	1/19/2010	14.8	3.9	50.4	4.9	0.0	0.0	-35.6	-1.0	-35.6	-1.0	NA	consolidating wells and controlling previously uncontrolled dehydration units and pnuematics
1/8/2009	11/21/2008	8673	EnCana	Stud Horse Butte 16-26 CF	MD-7056	10/26/2009	14.8	2.9	16.7	1.6	0.0	0.0	-1.9	1.3	-1.9	1.4	NA	
10/2/2009	11/21/2008	8672	EnCana	Crimson State 12-36	CT-8672	1/19/2010	2.6	0.5	0.0	0.0	0.0	0.0	2.6	0.5	3.9	0.6	NA	
10/2/2009	12/1/2008	8704	EnCana	Jonah Federal 5-6 CF	MD-8704	1/19/2010	14.2	2.9	14.2	1.5	0.0	0.0	0.0	1.4	0.0	1.5	NA	
10/2/2009	12/3/2008	8709	EnCana	Stud Horse Butte 3-34 CF	MD-8709	1/19/2010	14.3	4.2	43.5	1.4	0.0	0.0	-29.2	2.8	-29.2	3.1	NA	consolidating wells and controlling previously uncontrolled tanks and dehydration units
10/2/2009	12/10/2008	8749	EnCana	Crimson State 16-2	CT-8749	1/19/2010	3.0	0.5	0.0	0.0	0.0	0.0	3.0	0.5	4.5	0.6	NA	
10/2/2009	12/10/2008	8750	EnCana	Yellow Point 1-34 CF	CT-8750	1/19/2010	2.9	0.5	0.0	0.0	0.0	0.0	2.9	0.5	4.4	0.6	NA	
10/2/2009	12/9/2008	8744	EnCana	Cabrito 13-30 CF	MD-8744	1/19/2010	43.2	8.6	77.5	2.0	0.0	0.0	-34.3	6.6	-34.3	7.3	NA	consolidating wells and controlling previously uncontrolled tanks and dehydration units
10/2/2009	1/29/2009	8748	EnCana	Crimson Federal 16-14	CT-8748	1/19/2010	5.3	0.8	0.0	0.0	0.0	0.0	5.3	0.8	8.0	0.9	NA	
10/9/2009	2/20/2008	7348	EnCana	Stud Horse Butte 11-22 CF	MD-7348	1/13/2010	31.9	6.8	12.6	3.4	0.0	0.0	19.3	3.4	19.3	3.4	NA	
10/9/2009	12/11/2008	8760	EnCana	Stud Horse Butte 3-36 CF	MD-8760	1/13/2010	20.6	4.1	64.1	3.2	0.0	0.0	-43.5	0.9	-43.5	1.0	NA	consolidating wells and controlling previously uncontrolled tanks and dehydration units
10/9/2009	12/15/2008	8766	EnCana	Stud Horse Butte 11-34 CF	MD-8766	1/13/2010	17.8	3.7	60.5	2.3	0.0	0.0	-42.7	1.4	-42.7	1.5	NA	consolidating wells and controlling previously uncontrolled tanks and dehydration units
10/9/2009	12/11/2008	8758	EnCana	Hacienda 6-17A	CT-8758	1/13/2010	4.4	0.7	0.0	0.0	0.0	0.0	4.4	0.7	6.6	0.8	NA	
10/9/2009	12/11/2008	8759	EnCana	Stud Horse Butte 2-36 CF	MD-8759	1/13/2010	22.7	4.1	20.3	2.2	0.0	0.0	2.4	1.9	3.6	2.1	NA	

10/9/2009	12/15/2008	8767	EnCana	Stud Horse Butte 1-36 CF	MD-8767	1/13/2010	24.7	4.5	43.2	1.9	0.0	0.0	-18.5	2.6	-18.5	2.8	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
10/9/2009	12/18/2008	8820	EnCana	Stud Horse Butte 8-14 CF	MD-8820	1/13/2010	19.3	3.7	16.7	0.4	0.0	0.0	2.6	3.3	3.9	3.6	NA	
10/9/2009	12/17/2008	8776	EnCana	Stud Horse Butte 12-29 CF	MD-8776	1/13/2010	23.1	4.4	92.3	1.6	0.0	0.0	-69.2	2.8	-69.2	3.1	NA	consolidating wells and controling previously uncontrolled dehydration units and pneumatics
10/9/2009	1/15/2009	8881	EnCana	Stud Horse Butte 84-9 CF	MD-8881	1/13/2010	20.1	4.0	34.8	0.8	0.0	0.0	-14.7	3.2	-14.7	3.5	NA	consolidating wells and controling previously uncontrolled dehydration units and pneumatics
10/9/2009	1/26/2009	8912	EnCana	Stud Horse Butte 1-29 CF	MD-8912	1/13/2010	23.0	4.3	213.0	4.8	0.0	0.0	-190.0	-0.5	-190.0	-0.5	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
10/16/2009	1/26/2009	8923	EnCana	Crimson Federal 15-24	MD-8923	1/13/2010	4.6	0.6	0.0	0.0	0.0	0.0	4.6	0.6	6.9	0.7	NA	
10/16/2009	1/27/2009	8922	EnCana	Yellow Point 10-13 CF	MD-8922	1/13/2010	20.4	3.5	87.6	3.4	0.0	0.0	-67.2	0.1	-67.2	0.1	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
10/16/2009	1/29/2009	8919	EnCana	Hacienda 6-19 CF	MD-8919	1/13/2010	5.7	1.1	17.3	0.4	0.0	0.0	-11.6	0.7	-11.6	0.8	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
10/16/2009	2/18/2009	9065	EnCana	Crimson Federal 10-36	MD-9065	1/13/2010	3.9	0.6	0.0	0.0	0.0	0.0	3.9	0.6	5.9	0.7	NA	
10/16/2009	2/20/2009	9059	EnCana	Stud Horse Butte 48-22 CF	MD-9059	1/13/2010	20.7	4.2	0.0	0.0	0	0	20.7	4.2	31.1	4.6	NA	
10/16/2009	2/26/2009	9070	EnCana	Crimson Unit 2-18	MD-9870	1/13/2010	4.4	0.6	0.0	0.0	0	0	4.4	0.6	6.6	0.7	NA	
10/16/2009	3/12/2009	9149	EnCana	Stud Horse Butte 124-11 CF	MD-9149	1/13/2010	16.1	3.8	17.9	0.1	0	0	-1.8	3.7	-1.8	4.1	NA	controlling previously uncontrolled tanks and dehydration units
10/16/2009	3/24/2009	9208	EnCana	Crimson Federal 7-35	CT-9208	1/13/2010	0.8	0.5	0.0	0.0	0	0	0.8	0.5	1.2	0.6	NA	
10/16/2009	3/27/2009	9216	EnCana	Stud Horse Butte 1-34 CF	MD-9216	1/13/2010	9.9	2.3	11.4	1.6	0	0	-1.5	0.7	-1.5	0.8	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
10/16/2009	4/1/2009	9253	EnCana	Stud Horse Butte 1-27 CF	MD-9253	1/13/2010	19.1	5.0	61.5	9.6	0	0	-42.4	-4.6	-42.4	-4.6	NA	consolidating wells and controlling previously uncontrolled dehydration units and pneumatics
10/23/2009	4/13/2009	9282	EnCana	Cabrito 2-31 CF	MD-9289	1/14/2010	8.6	1.9	10.7	1.0	0	0	-2.1	0.9	-2.1	1.0	NA	
10/23/2009	4/13/2009	9283	EnCana	Crimson Unit B-31	CT-9283	1/14/2010	0.8	0.5	0.0	0.0	0	0	0.8	0.5	1.2	0.6	NA	
10/23/2009	4/27/2009	9354	EnCana	Hacienda 5-20	MD-9354	1/14/2010	2.6	0.8	0.0	0.0	0	0	2.6	0.8	3.9	0.9	NA	
10/23/2009	4/30/2009	9351	EnCana	Stud Horse Butte 16-28/9-28	MD-9351	1/14/2010	7.3	2.2	36.4	1.8	0	0	-29.1	0.4	-29.1	0.4	NA	consolidating wells and controlling previously uncontrolled dehydration units, pneumatics, and tanks
NA	5/7/2009	9386	EnCana	Stud Horse Butte 12-15 CF	MD-7782	10/26/2009	27.4	6.9	0.0	0.0	22.7	2.5	4.7	4.4	7.1	4.8	NA	
10/23/2009	5/22/2009	9455	EnCana	Stud Horse Butte 2-28 CF	MD-9455	1/14/2010	18.9	4.6	14.0	2.6	0	0	4.9	2.0	7.4	2.2	NA	
10/23/2009	5/22/2009	9456	EnCana	Stud Horse Butte 15-28 CF	MD-9456	1/14/2010	18.7	4.7	5.8	3.3	0	0	12.9	1.4	19.4	1.5	NA	
10/23/2009	5/22/2009	9451	EnCana	Hacienda 12-21	CT-9451	1/14/2010	1.7	0.7	0.0	0.0	0	0	1.7	0.7	2.6	0.8	NA	
10/23/2009	5/27/2009	9476	EnCana	Yellow Point 10-14 CF	MD-9476	1/14/2010	12.6	3.3	7.5	3.1	0	0	5.1	0.2	7.7	0.2	NA	
10/23/2009	6/2/2009	9500	EnCana	Crimson Federal 2-13	CT-9500	1/14/2010	1.4	0.6	0.0	0.0	0	0	1.4	0.6	2.1	0.7	NA	
10/23/2009	6/24/2009	9592	EnCana	Jonah Federal 2-8 X CF	MD-9592	1/14/2010	8.3	2.0	8.5	3.6	0	0	-0.2	-0.8	-0.2	-0.8	NA	Decrease due to decrease in production
10/23/2009	7/1/2009	9654	EnCana	Cabrito B-25 CF	MD-9654	1/14/2010	13.9	3.7	16.5	4.8	0	0	-2.6	-1.1	-2.6	-1.1	NA	Decrease due to decrease in production
10/23/2009	9/3/2009	9903	EnCana	Stud Horse Butte 53-16 CF	MD-9903	1/14/2010	9.4	2.4	10.9	0.9	0	0	-1.5	1.5	-1.5	1.7	NA	Controlled Pneumatic Pumps
11/6/2009	10/10/2008	8553	EnCana	Jonah Storage Yard Engines	MD-8553	12/10/2009	0.2	0.5	0.0	0.0	0.0	0.0	0.2	0.5	0.3	0.6	NA	Addition of three engines - Volvo Penta TAAD741GE
11/6/2009	8/3/2009	9725	EnCana	Section 36 Water Management Facility	MD-9725	1/7/2010	11.9	15.2	0.0	0.0	11.9	3	0.0	12.2	0.0	13.4	NA	Modify Water Handling Facility
	10/7/2009	9983	EnCana	SOI, 95-18 Water Treatment Facility	CT-9983	3/23/2010	18.2	6.6	0.0	0.0	0	0	18.2	6.6	27.3	7.3	NA	
NA	10/13/2009	10009	EnCana	Yellow Point 8-13 CF	MD-8199	11/25/2009	9.0	2.6	0.0	0.0	18.4	3.4	-9.4	-0.8	-9.4	-0.8	NA	Short Form, permitting at actual production instead of Maximum Equipment Capacity
NA	10/14/2009	10027	EnCana	Stud Horse Butte 2-34 CF	MD-7179	11/25/2009	9.6	3.4	9.4	3.0	0	0	0.2	0.4	0.3	0.4	NA	Short Form
NA	11/2/2009	10105	EnCana	Stud Horse Butte 11-17 CF	MD-8202	11/30/2009	28.1	7.3	0.0	0.0	30.5	6.2	-2.4	1.1	-2.4	1.2	NA	
12/10/2009	11/16/2009	10149	EnCana	Cabrito 61-13	CT-10149	2/5/2010	4.9	1.4	0.0	0.0	0	0	4.9	1.4	7.4	1.5	NA	
NA	11/23/2009	10159	EnCana	Jonah Federal 5-4 CF	MD-7972	12/11/2009	7.6	1.5	0.0	0.0	28.2	6.3	-20.6	-4.8	-20.6	-4.8	NA	Short Form
NA	11/25/2009	10180	EnCana	Stud Horse Butte 3-36 CF	8760	2/19/2010	6.7	1.8	0.0	0.0	20.6	4.1	-13.9	-2.3	-13.9	-2.3	NA	Short Form
NA	11/25/2009	10179	EnCana	Stud Horse Butte 12-36 CF	MD-7974	12/11/2009	10.8	3.2	0.0	0.0	28.1	6.1	-17.3	-2.9	-17.3	-2.9	NA	Short Form
NA	12/2/2009	10195	EnCana	Stud Horse Butte 2-36 CF	MD-8759	2/19/2010	11.9	3.1	0.0	0.0	22.7	4.1	-10.8	-1.0	-10.8	-1.0	NA	Short Form
1/8/2010	12/3/2009	10192	EnCana	Stud Horse Butte 7-22 CF	MD-10192	5/20/2010	8.9	2.8	4.5	1.5	0	0	4.4	1.3	6.6	1.4	NA	
1/19/2010	12/10/2009	10216	EnCana	Stud Horse Butte 4-33 CF	MD-10261	2/23/2010	3.3	1.4	9.1	0.7	0	0	-5.8	0.7	-5.8	0.8	NA	
NA	12/16/2009	10251	EnCana	Stud Horse Butte 11-36 CF	MD-8441	1/4/2010	11.6	3.5	0.0	0.0	18.5	4.1	-6.9	-0.6	-6.9	-0.6	NA	Short Form
1/19/2010	12/23/2009	10261	EnCana	Jonah Federal 3-5 CF	MD-10261	2/23/2010	3.3	1.2	9.1	0.8	0	0	-5.8	0.4	-5.8	0.4	NA	
NA	1/28/2010	10349	EnCana	Stud Horse Butte 4-27 CF	MD-8104	2/25/2010	5.6	1.8	0.0	0.0	22.6	4.5	-17.0	-2.7	-17.0	-2.7	NA	Short Form
NA	2/4/2010	10384	EnCana	Stud Horse Butte 11-22 CF	MD-7348	2/25/2010	12.3	3.2	0.0	0.0	31.9	6.8	-19.6	-3.6	-19.6	-3.6	NA	Short Form
	1/21/2010	10324	EnCana	Temporaty Oil Storage Tanks	wv-10324	2/23/2010	4.8	0.0	0.0	0.0	0	0	4.8	0.0	7.2	0.0	NA	
NA	2/18/2010	10423	EnCana	Jonah Federal 4-18 CF	MD-10423	5/12/2010	10.8	1.3	19.5	0.5	0	0	-8.7	0.8	-8.7	0.9	NA	
NA	2/24/2010	10430	EnCana	Section 32 Methanol Tank	wv-10430	3/17/2010	0.5	0.0	0.0	0.0	0.3	0	0.2	0.0	0.3	0.0	NA	Adding 2 methanol tanks, 3 TEG tanks and 2 PG tanks
NA	2/24/2010	10431	EnCana	Jonah Federal 2-8 X CF	MD-9592	3/15/2010	19.3	3.0	0.0	0.0	8.3	2.8	11.0	0.2	11.0	0.2	NA	
NA	3/10/2010	10501	EnCana	Stud Horse Butte 07-36	MD-8467	2/23/2010	9.9	1.7	0.0	0.0	15.7	2.9	-5.8	-1.2	-5.8	-1.2	NA	Short Form
4/30/2010	3/17/2010	10517	EnCana	Jonah Federal 01-04X CF	MD-10517	6/2/2010	9.6	1.6	41.8	1.9	0	0	-32.2	-0.3	-32.2	-0.3	NA	consolidation- Flash emissions and pneumatic pumps now controlled
NA	3/18/2010	10482	EnCana	Stud Horse Butte 122-10WW	wv-10482	3/18/2010	0.3	0.3	0.0	0.0	0	0	0.3	0.3	0.4	0.3	NA	
NA	4/8/2010	10552	EnCana	Stud Horse Butte 03-27 CF	MD-7696	4/16/2010	25.2	2.9	0.0	0.0	24.9	4.8	0.3	-1.9	0.5	-1.9	NA	Short Form
NA	4/15/2010	10589	EnCana	Stud Horse Butte 84-9 CF	MD-8881	4/22/2010	24.5	4.7	0.0	0.0	20.1	4	4.4	0.7	6.6	0.8	NA	Short Form
NA	4/20/2010	10632	EnCana	Stud Horse Butte 4-36WW	wv-10632	5/12/2010	0.4	0.3	0.0	0.0	0	0	0.4	0.3	0.6	0.3	NA	
6/11/2010	5/11/2010	10700	EnCana	Tot Federal #1	MD-10700	7/16/2010	6.1	0.9	6.1	0.5	0	0	0.0	0.4	0.0	0.4	NA	
NA	5/13/2010	10699	EnCana	SAG 34-19	CT-7519	5/27/2010	11.3	2.2	0.0	0.0	12.8	0.9	-1.5	1.3	-1.5	1.3	NA	Short Form
NA	5/19/2010	10723	EnCana	Stud Horse Butte 07-15	MD-7692	5/27/2010	10.5	4.1	0.0	0.0	10.3	3.8	0.2	0.3	0.3	0.2	NA	
	6/1/2010	10789	EnCana	Section 36 Water Management Facility			10.9	25.3	0.0	0.0	11.9	15.2	-1.0	10.1	-1.5	11.1	NA	Modify Water Management Facility
6/25/2010	6/9/2010	10806	EnCana	Stud Horse Butte 1-32 CF	MD-10806	7/29/2010	12.3	2.5	29.4	4.3	0	0	-17.1	-1.8	-17.1	-1.8	NA	Short Form
7/30/2010	7/12/2010	10925	EnCana	Cabrito 13-19 CF	MD-10925	9/3/2010	24.0	3.6	52.5	2.5	0	0	-28.5	1.1	-28.5	1.2	NA	Consolidation
	7/21/2010		EnCana	Stud Horse Butte 53-16 CF	MD-9983	8/9/2010	23.9	4.4	0.0	0.0	9.4	2.4	14.5	2.0	21.8	2.2	NA	
NA	8/3/2010	11016	EnCana	Stud Horse Butte 1-29 CF	MD-8912	8/16/2010	22.6	5.1	0.0	0.0	23	4.3	-0.4	0.8	-0.4	0.8	NA	Short Form
	8/3/2010	11017	EnCana	SOI, 95-18 Water Treatment Facility	CT-9983		17.2	5.6	0.0	0.0	18.2	6.6	-1.0	-1.0	-1.0	-1.0	NA	Replaced 340s engines with a 3412TA from Section 36
NA	8/4/2010	11014	EnCana	Stud Horse Butte 13-26 CF	MD-8280	8/11/2010	27.3	3.8	0.0	0.0	31.8	7.6	-4.5	-3.8	-4.5	-3.8	NA	
8/27/2010	8/5/2010	11015	EnCana	Stud Horse Butte 4-28 CF	MD-11015	9/28/2010	13.6	4.0	21.9	0.5	0	0	-8.3	3.5	-8.3	3.9	NA	
NA	8/10/2010	11048	EnCana	Stud Horse Butte 11-26 CF	MD-8110	9/20/2010	18.9	3.0	0.0	0.0	35.1	8.8	-16.2	-5.8	-16.2	-5.8	NA	
NA	3/11/2010	11034	EnCana	Section 32 Storage Yard (Previously Section 32 Methanol Tank Storage Facity)			0.7	0.5	0.0	0.0	0.5	0	0.2	0.5	0.3	0.6	NA	Adding generator engine
NA	8/26/2010	11082	EnCana	Stud Horse Butte 48-16	CT-7162	9/29/2010	6.5	0.8	0.0	0.0	11	0.6	-4.5	0.2	-4.5	0.2	NA	
11/19/2010	9/9/2010	11150	EnCana	Stud Horse Butte 15-27	MD-11150	12/22/2010	18.0	2.6	16.7	2.4	0	0	1.3	0.2	2.0	0.2	NA	
NA	9/9/2010	11149	EnCana	Stud Horse Butte 1-34 CF	MD-9216		9.4	1.5	0.0	0.0	9.9	2.3	-0.5	-0.8	-0.5	-0.8	NA	Short Form
NA	9/20/2010	11161	EnCana	Stud Horse Butte 11-20 CF	MD-8490	10/28/2010	28.5	5.1	0.0	0.0	51.3	8.9	-22.8	-3.8	-22.8	-3.8	NA	Short Form
NA	9/29/2010	11205	EnCana	Stud Horse Butte 12-29 CF	MD-8776	11/5/2010	19.4	3.4	0.0	0.0	23.1	4.4	-3.7	-1.0	-3.7	-1.0	NA	Short Form
1/4/2011	10/12/2010	11250	EnCana	Stud Horse Butte 11-17 CF	MD-11250	2/8/2011	17.6	5.8	0.0	0.0	30.5	6.2	-12.9	-0.4	-12.9	-0.4	NA	Short Form
NA	10/13/2010	11248	EnCana	Stud Horse Butte 2-33 CF	MD-11248	12/28/2010	7.9	1.7	13.5	1.9	0	0	-5.6	-0.2	-5.6	-0.2	NA	Short Form
NA	10/14/2010	11249	EnCana	Stud Horse Butte 10-33 CF	MD-11249	12/29/2010	8.0	1.8	13.9	0.6	18.1	4.4	-24.0	-3.2	-24.0	-3.2	NA	Short Form
1/4/2011	10/19/2010	11276	EnCana	Cabrito B-25 CF	MD-11276	2/8/2011	16.9	5.1	0.0	0.0	13.9	3.7	3.0	1.4	4.5	1.5	NA	Short Form
1/4/2011	10/25/2010	11289	EnCana	Stud Horse Butte 16-18 CF	MD-11289	2/8/2011	3.8	1.4	0.0	0.0	9.4	2.6	-5.6	-1.2	-5.6	-1.2	NA	
1/7/2011	11/12/2010	11399	EnCana	Stud Horse Butte 10-35 CF	MD-11399	2/8/2011	20.5	2.9	97.8	9.1	0	0	-77.3	-6.2	-77.3	-6.2	NA	Consolidation
1/10/2011	11/12/2010	11400	EnCana	Cabrito 14-25 CF	MD-11400	3/4/2011	14.3	3.6	115.3	10.4	0.0	0.0	-101.0	-6.8	-101.0	-6.8	NA	Consolidation
1/10/2011	11/15/2010	11428	EnCana	Stud Horse Butte 01-35 CF	MD-11428	3/4/2011	16.6	3.1	82.7	7.0	0.0	0.0	-66.1	-3.9	-66.1	-3.9	NA	Consolidation

2/14/2011	11/16/2010	11435	Encana	Cabrito 13-30 CF	MD-11435	3/22/2011	23.6	4.1	0.0	0.0	43.2	9.6	-19.6	-4.5	-19.6	-4.5	NA	Short Form
1/31/2011	11/24/2010	11424	Encana	Stud Horse Butte B-14 CF	MD-11424	3/9/2011	9.0	3.0	0.0	0.0	19.3	3.7	-10.3	-0.7	-10.3	-0.7	NA	2010 Short Form
1/31/2011	11/22/2010	11426	Encana	Stud Horse Butte 122-10 CF	MD-11426	3/9/2011	12.9	4.1	0.0	0.0	18.2	3.7	-5.3	0.4	-8.0	0.4	NA	Short Form
1/14/2011	12/7/2010	11469	Encana	SAG 73-20 CF	CT-11469	2/25/2011	4.1	1.2	0.0	0.0	0.0	0.0	4.1	1.2	6.2	1.2	NA	2010 Full Application [new facility]
1/14/2011	12/8/2010	11467	Encana	SAG 17-30 CF	CT-11467	2/25/2011	7.2	2.1	0.0	0.0	0.0	0.0	7.2	2.1	10.8	2.3	NA	2010 Full Application [new facility]
1/24/2011	12/13/2010	11488	Encana	Stud Horse Butte 16-34R CF	MD-11488	3/1/2011	9.0	2.4	0.0	0.0	19.4	4.0	-10.4	-1.6	-10.4	-1.6	NA	2010 Short Form
1/31/2011	12/14/2010	11516	Encana	Stud Horse Butte 2-34 CF	MD-111516	3/9/2011	15.0	4.2	0.0	0.0	9.6	3.4	5.4	0.8	8.1	0.9	NA	2010 Short Form
4/4/2011	1/13/2010	11623	Encana	Stud Horse Butte 15-19 CF	MD-11623	5/10/2011	9.3	2.1	0.0	0.0	11.0	2.6	-1.7	-0.5	-1.7	-0.5	NA	2010 Short Form
4/4/2011	1/13/2011	11622	Encana	Stud Horse Butte 7-26 CF	MD-11622	5/10/2011	15.3	4.6	0.0	0.0	38.1	8.6	-22.8	-4.0	-22.8	-4.0	NA	2010 Short Form
3/28/2011	1/14/2011	11614	Encana	Corona-Stud Horse Butte 10-30 CF	AP-11614		12.3	3.2	0.0	0.0	27.3	8.3	-15.0	-5.1	-15.0	-5.1	NA	2010 Short Form
4/11/2011	1/20/2011	11659	Encana	Stud Horse Butte 4-28 CF	MD-11659	5/18/2011	8.4	2.9	43.2	4.5	0.0	0.0	-34.8	-1.1	-34.8	-1.1	NA	2010 Short Form
4/18/2011	1/24/2011	11658	Encana	Corona - Stud Horse Butte 10-31 CF	MD-11658	5/24/2011	11.7	3.5	0.0	0.0	33.5	7.1	-21.8	-3.6	-21.8	-3.6	NA	2010 Short Form
4/11/2011	1/25/2011	11660	Encana	Stud Horse Butte 4-35 CF	MD-11660	5/18/2011	10.0	2.1	22.3	1.8	0.0	0.0	-12.3	0.3	-12.3	0.3	NA	2010 Full Application
11/11/2011	2/15/2010	11772	Encana	Section 36 WMF			36.6	29.5	0.0	0.0	15.4	24.8	21.2	4.7	31.8	5.2	NA	
4/18/2011	3/1/2011	11801	Encana	Jonah Federal 5-6 CF	MD-11801	5/24/2011	8.0	2.0	0.0	0.0	14.2	2.9	-6.2	-0.9	-6.2	-0.9	NA	
5/9/2011	3/9/2011	11825	Encana	Jonah Federal 45-08 H	CT-11825	6/14/2011	5.1	1.5	0.0	0.0	0.0	0.0	5.1	1.5	7.7	1.7	NA	
5/9/2011	3/11/2011	11845	Encana	Jonah Federal 13-7	MD-11845	6/14/2011	5.6	1.2	5.9	1.2	0.0	0.0	-0.3	0.0	-0.3	0.0	NA	
5/16/2011	3/29/2011	11896	Encana	Stud Horse Butte 32-10	MD-11896	6/21/2011	4.5	1.2	0.0	0.0	5.1	1.0	-0.6	0.2	-0.6	0.2	NA	
5/16/2011	4/5/2011	11934	Encana	Stud Horse Butte 15-28 CF	MD-11934	6/21/2011	9.5	2.8	0.0	0.0	18.7	4.7	-9.2	-1.9	-9.2	-1.9	NA	
5/16/2011	4/13/2011	11950	Encana	Stud Horse Butte 12-15 CF	MD-11950	6/21/2011	16.4	4.2	0.0	0.0	27.4	6.9	-11.0	-2.7	-11.0	-2.7	NA	
7/18/2011	5/16/2011	12065	Encana	SAG 34-19	MD-12065	8/24/2011	9.9	3.4	0.0	0.0	11.3	2.2	-1.4	1.2	-1.4	1.3	NA	2010 Short Form
8/22/2011	5/23/2011	12087	Encana	Stud Horse Butte 84-09 CF	MD-12087	9/28/2011	10.6	5.9	0.0	0.0	24.5	4.7	-5.9	1.2	-5.9	1.3	NA	2010 Short Form
7/18/2011	5/27/2011	12080	EnCana	Yellow Point 04-12 CF	MD-12080	8/24/2011	8.9	2.3	0.0	0.0	31.9	4.4	-23.0	-2.1	-23.0	-2.1	NA	2010 Short Form
7/25/2011	6/2/2011	12103	EnCana	Stud Horse Butte 01-27 CF	MD-12103	8/30/2011	10.5	2.9	0.0	0.0	19.1	5.0	-8.6	-2.1	-8.6	-2.1	NA	2010 Short Form
7/18/2011	6/2/2011	12102	EnCana	Stud Horse Butte 03-34 CF	MD-12102	8/24/2011	9.0	2.6	0.0	0.0	14.3	4.2	-4.5	-1.6	-4.5	-1.6	NA	2010 Short Form
8/15/2011	6/8/2011	12147	EnCana	Stud Horse Butte 04-26 CF	MD-12147	9/20/2011	12.5	3.8	0.0	0.0	27.5	8.9	-15.0	-5.1	-15.0	-5.1	NA	2010 Short Form
8/15/2011	6/8/2011	12148	EnCana	Stud Horse Butte 07-22 CF	MD-12148	9/20/2011	16.0	4.9	0.0	0.0	8.9	2.8	7.1	2.1	10.7	2.3	NA	2010 Short Form
8/15/2011	6/14/2011	12143	EnCana	SAG 59-29	MD-12143	9/20/2011	5.7	1.5	0.0	0.0	0.0	0.0	5.7	1.5	8.6	1.7	NA	2010 Full Application
8/15/2011	6/16/2011	12166	EnCana	Stud Horse Butte 04-33 CF	MD-12166	9/20/2011	7.7	2.5	0.0	0.0	3.3	1.4	4.4	1.1	6.6	1.2	NA	2010 Short Form
8/15/2011	6/30/2011	12217	EnCana	Stud Horse Butte 53-16 CF	MD-12217	9/20/2011	14.5	4.7	0.0	0.0	23.9	4.4	-9.4	0.3	-9.4	0.3	NA	2010 Short Form
8/15/2011	6/30/2011	12216	EnCana	Cabrito 14-25 CF	MD-12216	9/20/2011	12.2	3.0	0.0	0.0	14.3	3.6	-2.1	-0.6	-2.1	-0.6	NA	2010 Short Form
9/6/2011	7/8/2011	12241	EnCana	Yellow Point 07-02 CF	MD-12241	10/11/2011	4.4	1.3	4.9	1.4	0.0	0.0	-0.5	-0.1	-0.5	-0.1	NA	2010 Short Form
	7/11/2011		EnCana	Hacienda 14-30			6.4	2.7	9.8	1.1	0.0	0.0	-3.4	1.6	-3.4	1.8	NA	
8/25/2011	7/14/2011	12233	EnCana	Stud Horse Butte 11-26 CF	MD-12233	10/4/2011	7.4	2.8	0.0	0.0	10.9	3.0	-11.5	-0.2	-11.5	-0.2	NA	2010 Short Form
9/26/2011	8/3/2011	12305	EnCana	Stud Horse Butte 16-28/9-28 CF	MD-12305	11/3/2011	7.6	2.5	0.0	0.0	7.3	2.2	0.3	0.3	0.5	0.3	NA	2010 Short Form
10/24/2011	8/4/2011	12298	EnCana	Stud Horse Butte 03-27 CF	MD-12298	11/29/2011	14.0	3.3	0.0	0.0	25.2	2.9	-11.2	0.4	-11.2	0.4	NA	2010 Short Form
10/3/2011	8/8/2011	12339	EnCana	Stud Horse Butte 01-35 CF	MD-12339	11/8/2011	11.6	3.5	0.0	0.0	16.6	3.1	-5.0	0.4	-5.0	0.4	NA	2010 Short Form
10/31/2011	9/1/2011	12432	EnCana	Stud Horse Butte 09-33	MD-12432	12/6/2011	7.4	2.0	18.9	3.0	0.0	0.0	-11.5	-0.2	-11.5	-0.2	NA	2010 Short Form
10/31/2011	9/15/2011	12449	EnCana	Stud Horse Butte 11-34 CF	MD-12449	12/6/2011	9.7	2.8	0.0	0.0	17.8	3.7	-8.1	-0.9	-8.1	-0.9	NA	2010 Short Form
11/14/2011	9/27/2011	12486	EnCana	Stud Horse Butte 02-28/10-28 CF	MD-12486	12/29/2011	12.3	4.2	0.0	0.0	18.9	4.6	-6.6	-0.4	-6.6	-0.4	NA	2010 Short Form
11/14/2011	9/30/2011	12536	EnCana	Jonah Federal 24-09 Single Well Facility	MD-12536	12/28/2011	5.0	1.4	0.0	0.0	0.0	0.0	5.0	1.4	7.5	1.5	NA	2010 Full Application
11/21/2011	10/6/2011	AP-12604	EnCana	Stud Horse Butte 01-36/19-36 CF	MD-12604	12/28/2011	11.3	3.4	0.0	0.0	24.7	4.5	-13.4	-1.1	-13.4	-1.1	NA	2010 Short Form
11/21/2011	10/10/2011	AP-12614	EnCana	Stud Horse Butte 01-34 CF	MD-12614	12/28/2011	6.3	1.8	0.0	0.0	9.4	1.5	-3.1	0.3	-3.1	0.3	NA	2010 Short Form
	10/14/2011		EnCana	Section 18 Water Management Facility			22.1	10.5	0.0	0.0	16.9	5.3	5.2	5.2	7.8	5.7	NA	Facility Application
12/5/2011	11/9/2011	AP-12697	EnCana	Stud Horse Butte 12-36 CF	MD-12697	1/10/2012	11.6	3.5	0.0	0.0	10.8	3.2	0.8	0.3	1.2	0.3	NA	2010 Short Form
12/23/2011	11/14/2011	AP-12705	EnCana	Stud Horse Butte 06-35 CF	MD-12705	1/31/2012	10.0	2.8	25.7	2.5	0.0	0.0	-15.7	0.3	-15.7	0.3	NA	2010 Short Form
1/9/2012	12/13/2011	AP-12859	EnCana	Stud Horse Butte 67-11 CF	CT-12859	2/14/2012	7.3	1.9	0.0	0.0	0.0	0.0	7.3	1.9	11.0	2.1	NA	2010 Full Application
1/23/2012	12/20/2011	AP-12876	EnCana	Stud Horse Butte 72-09 CF			16.7	5.7	0.0	0.0	0.0	0.0	16.7	5.7	25.1	6.3	NA	2010 Full Application
1/30/2012	1/10/2012	AP-12911	EnCana	Stud Horse Butte 16-32 CF			4.9	1.6	17.1	2.1	0.0	0.0	-12.2	-0.5	-12.2	-0.5	NA	2010 Full Application
1/30/2012	1/11/2012	AP-12919	EnCana	Stud Horse Butte 04-27 CF			5.0	1.5	0.0	0.0	5.6	1.8	-0.6	-0.3	-0.6	-0.3	NA	2010 Short Form
2/6/2012	1/19/2012	AP-12948	EnCana	Jonah Federal 08-07 CF	MD-12948	3/19/2012	7.4	2.5	24.3	2.7	0.0	0.0	-16.9	-0.2	-16.9	-0.2	NA	2010 Full Application
4/9/2012	3/1/2012	AP-13186	EnCana	Stud Horse Butte 41-11 Single Well Facility	MD-13186	5/15/2012	3.8	1.3	0.0	0.0	0.0	0.0	3.8	1.3	5.7	1.4	NA	2010 Full Application
6/18/2012	3/7/2012	AP-13195	EnCana	Stud Horse Butte 12-36/29-35 CF	MD-13195	7/24/2012	11.1	2.9	0.0	0.0	11.6	3.5	-0.5	-0.6	-0.5	-0.6	NA	2010 Short Form
6/18/2012	3/8/2012	AP-13194	EnCana	Jonah Federal 05-04 CF	MD-13194	7/24/2012	8.3	2.7	0.0	0.0	7.6	1.5	0.7	1.2	1.1	1.4	NA	2010 Short Form
	3/14/2012		EnCana	Portable Water Pump Generator			0.5	0.5	0.0	0.0	0.0	0.0	0.5	0.5	0.8	0.6	NA	Full Application
	3/15/2012		EnCana	SHH 2-36			0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.5	0.3	NA	Full Application
	3/15/2012		EnCana	CAH 14-25			0.3	0.2	0.0	0.0	0.0	0.0	0.3	0.2	0.5	0.2	NA	Full Application
	3/19/2012		EnCana	SHH 15-27			0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.5	0.3	NA	Full Application
6/18/2012	5/11/2012	AP-13400	EnCana	Cabrito 02-31 CF	MD-13400	7/24/2012	7.1	2.1	0.0	0.0	8.6	1.9	-1.5	0.2	-1.5	0.3	NA	2010 Short Form
6/18/2012	5/14/2012	AP-13455	EnCana	Stud Horse Butte 16-35 CF	MD-13455	7/24/2012	9.7	3.3	0.0	0.0	16.4	4.2	-6.7	-0.9	-6.7	-0.9	NA	2010 Short Form
8/6/2012	6/18/2012	AP-13565	EnCana	Stud Horse Butte 06-32 CF	MD-13565	9/17/2012	9.7	3.3	60.2	6.9	0.0	0.0	-50.5	-3.6	-50.5	-3.6	NA	2010 Full Application
7/30/2012	6/22/2012	AP-13564	EnCana	Stud Horse Butte 14-33 CF	MD-13564	9/5/2012	4.5	1.6	23.9	2.4	0.0	0.0	-19.4	-0.8	-19.4	-0.8	NA	2010 Full Application
8/20/2012	7/3/2012	AP-13619	EnCana	Stud Horse Butte 07-15 CF	MD-13619	2/28/2013	13.1	5.1	0.0	0.0	18.5	4.1	-5.4	1.0	-5.4	1.2	NA	2010 Short Form
8/20/2012	7/10/2012	AP-13639	EnCana	Stud Horse Butte 11-34 CF	MD-13639	2/28/2013	9.6	2.9	0.0	0.0	9.7	2.0	-0.1	0.1	-0.1	0.1	NA	2010 Short Form
8/20/2012	7/13/2012	AP-13635	EnCana	Stud Horse Butte 02-34 CF	MD-13635	2/28/2013	8.2	2.9	0.0	0.0	15.0	4.2	-6.8	-1.3	-6.8	-1.3	NA	2010 Short Form
1/14/2013	7/31/2012	AP-13716	EnCana	Cabrito 72-29 CF			41.6	14.2	0.0	0.0	5.6	1.5	36.0	12.7	54.0	14.0	NA	2010 Full Application
9/17/2012	8/16/2012	AP-13776	EnCana	Cabrito 61-13 CF	MD-13776	10/30/2012	10.7	2.4	0.0	0.0	4.9	1.4	5.8	1.0	8.7	1.1	NA	2010 Short Form
10/8/2012	8/22/2012	AP-13795	EnCana	Stud Horse Butte 13-26 CF	MD-13795	11/14/2012	15.8	4.4	0.0	0.0	27.3	3.8	-11.5	0.6	-11.5	0.7	NA	2010 Short Form
12/3/2012	9/18/2012	AP-13923	EnCana	Stud Horse Butte 10-33 CF	MD-13923	1/8/2013	8.1	2.4	0.0	0.0	8.0	1.4	0.1	1.0	0.1	1.1	NA	2010 Short Form
11/16/2012	9/28/2012	AP-13961	EnCana	Portable Rod Pump Engines			1.0	3.0	0.0	0.0	0.0	0.0	1.0	3.0	1.5	3.3	NA	Full Permit Application
1/18/2013	10/15/2012	AP-14002	EnCana	CAH 61-13 Flow Back Cooler			0.5	0.3	0.0	0.0	0.0	0.0	0.5	0.3	0.8	0.3	NA	Full Permit Application
12/20/2012	10/26/2012	AP-14051	EnCana	Stud Horse Butte 122-10 CF	MD-14051	2/4/2013	9.5	4.6	0.0	0.0	13.1	4.1	-3.6	0.5	-3.6	0.6	NA	2010 Short Form
1/18/2013	11/9/2012	AP-14133	EnCana	Stud Horse Butte 53-16 CF	MD-14133	2/26/2013	13.7	4.3	0.0	0.0	14.5	4.6	-0.8	-0.3	-0.8	-0.3	NA	2010 Short Form
12/20/2012	11/9/2012	AP-14115	EnCana	Jonah Ridge Tower			0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	NA	Full Permit Application
	11/12/2012		EnCana	CAH 72-29 VRU			0.5	1.4	0.0	0.0	0.0	0.0	0.5	1.4	0.8	1.5	NA	Full Permit Application
3/25/2013	1/3/2013	AP-14305	EnCana	Stud Horse Butte 02-36 CF	MD-14305	4/30/2013	11.7	3.4	0.0	0.0	12.2	3.3	-0.5	0.1	-0.5	0.1	NA	2010 Short Form
4/29/2013	2/8/2013	AP-14485	EnCana	Stud Horse Butte 11-17 CF	MD-14485	6/4/2013	14.9	5.5	0.0	0.0	17.6	5.8	-2.7	-0.3	-2.7	-0.3	NA	2010 Short Form
	3/26/2013		EnCana	Jonah and NPL Portable Engine			1.4	1.0	0.0	0.0	0.0	0.0	1.4	1.0	2.1	1.1	NA	Full Permit Application
6/17/2013	3/28/2013	AP-14673	Encana	Stud Horse Butte 07-26 CF	MD-14673	7/23/2013	11.4	3.7	0.0	0.0	15.3	4.6	-3.9	-0.9	-3.9	-0.9	NA	2010 Short Form
7/16/2013	4/18/2013	AP-14815	Encana	Stud Horse Butte 04-26 CF	MD-14815	8/20/2013	13.2	4.0	0.0	0.0	12.5	3.7	0.7	0.3	1.1	0.3	NA	2010 Short Form
7/16/2013	4/22/2013	AP-14911	Encana	Stud Horse Butte 16-33 CF	MD-14911	8/20/2013	6.2	1.9	9.4	2.3	0.0	0.0	-3.2	-0.4	-3.2	-0.4	NA	Full Permit Application
7/22/2013	5/6/2013	AP-14920	Encana	Stud Horse Butte 67-11 CF	MD-14920	8/27/2013	13.1	5.1	0.0	0.0	7.3	1.9	5.8	3.2	8.7	3.5	NA	2010 Short Form
7/22/2013	5/6/2013	AP-14921	Encana	Stud Horse Butte 11-26 CF	MD-14921	8/27/2013	10.6	3.1	0.0	0.0	7.4	2.8	3.2	0.3	4.9	0.3	NA	2010 Short Form
8/5/2013	6/3/2013	AP-15086	Encana	Stud Horse Butte 10-35 CF	MD-15086	9/10/2013	9.9	2.6	0.0	0.0	20.5	2.9	-10.6	-0.3	-10.6	-0.3	NA	2010 Short Form
8/5/2013	6/6/2013	AP-15085	Encana	Stud Horse Butte 01-35 CF	MD-15085	9/10/2013	11.0	3.3	0.0	0.0	11.6	3.5	-0.6	-0.2	-0.6	-0.2	NA	2010 Short Form
	6/18/2013		Encana	Jonah and NPL Portable Cooler Engines			3.7	2.6	0.0	0.0	0.0	0.0	3.7	2.6	5.5	2.9	NA	Full Permit Application
10/7/2013	7/1/2013	AP-15229	Encana	Stud Horse Butte 06-32 CF	MD-15229	11/13/2013	19.7	5.3	21.0	5.0	20.7	6.7	-22.0	-6.4	-22.0	-6.4	NA	2010 Short Form
10/7/2013	7/3/2013	AP-15215	Encana	Stud Horse Butte 10-33 CF	MD-15215	11/13/2013	16.4	4.8	0.0	0.0	8.1	2.4	8.3	2.4	12.5	2.6	NA	2010 Short Form

10/28/2013	7/16/2013	AP-15280	Encana	SAG 05-28 CF	MD-15280	12/10/2013	4.2	2.1	12.0	0.4	0.0	0.0	-7.8	1.7	-7.8	1.8	NA	Full Permit Application
10/28/2013	7/16/2013	AP-15281	Encana	Stud Horse Butte 04-33 CF	MD-15281	12/10/2013	7.0	3.0			0.2	3.8	-1.2	-0.8	-1.2	-0.8	NA	2010 Short Form
10/28/2013	7/18/2013	AP-15282	Encana	Cabrito 13-30 CF	MD-15282	12/10/2013	18.1	6.5	0.0	0.0	32.8	8.0	-14.7	-1.5	-14.7	-1.5	NA	2010 Short Form
10/28/2013	8/1/2013	AP-15335	Encana	Stud Horse Butte 03-36 CF	MD-15335	12/10/2013	6.3	2.1	0.0	0.0	4.2	1.8	2.1	0.3	2.1	0.3	NA	2010 Short Form
10/28/2013	8/7/2013	AP-15369	Encana	Stud Horse Butte 06-35 CF	MD-15369	12/10/2013	10.9	4.1	0.0	0.0	6.6	2.8	4.3	1.3	6.5	1.4	NA	2010 Short Form
5/2/2014	8/13/2013	AP-15410	Encana	Cabrito 72-29 CF	MD-15410	6/3/2014	21.4	8.9	0.0	0.0	41.6	14.2	-20.2	-5.3	-20.2	-5.3	NA	2010 Short Form
11/4/2013	8/14/2013	AP-15393	Encana	Stud Horse Butte 02-33 CF	MD-15393	12/11/2013	3.4	1.7	0.0	0.0	6.8	1.4	-3.4	0.3	-3.4	0.3	NA	2010 Short Form
11/4/2013	8/20/2013	AP-15415	Encana	Stud Horse Butte 07-16 CF	MD-15415	12/11/2013	8.0	3.6	0.0	0.0	12.7	5.5	-4.7	-1.9	-4.7	-1.9	NA	2010 Short Form
11/4/2013	8/22/2013	AP-15411	Encana	Stud Horse Butte 15-27 CF	MD-15411	12/11/2013	16.9	4.8	0.0	0.0	15.7	2.8	1.2	2.0	1.8	2.2	NA	2010 Short Form
	9/13/2013		Encana	Section 32 Inventory Yard			1.9	1.3	0.0	0.0	0.0	0.0	1.9	1.3	2.9	1.4	NA	Full Application
12/2/2013	10/2/2013	AP-15548	Encana	Yellow Point 117-12V Single Well Facility			6.5	2.3	0.0	0.0	0.0	0.0	6.5	2.3	9.8	2.6	NA	Full Application
1/13/2014	11/11/2013	AP-15689	Encana	Stud Horse Butte 04-27 CF			15.7	6.3	0.0	0.0	21.9	7.7	-6.2	-1.4	-6.2	-1.4	NA	2010 Short Form
1/13/2014	11/19/2013	AP-15708	Encana	Stud Horse Butte 13-26 CF			8.6	3.4	0.0	0.0	14.1	4.4	-5.5	-1.0	-5.5	-1.0	NA	2010 Short Form
2/14/2014	12/17/2013	AP-15863	Encana	Cabrito 08-25 CF	MD-15863	3/25/2014	12.3	3.7	0.0	0.0	14.3	5.1	-2.0	-1.4	-2.0	-1.4	NA	2010 Short Form
2/14/2014	12/19/2013	AP-15862	Encana	SAG 34-19 CF	MD-15862	3/25/2014	7.4	3.5	0.0	0.0	7.3	3.4	0.1	0.1	0.2	0.1	NA	2010 Short Form
3/28/2014	1/30/2014	AP-15987	Encana	Cabrito 61-13 CF			13.6	4.4	0.0	0.0	11.7	2.7	4.9	1.7	7.4	1.9	NA	2010 Short Form
4/18/2014	2/28/2014	AP-16093	Encana	Stud Horse Butte 08-14 CF			8.8	3.6	0.0	0.0	7.4	3.0	1.4	0.6	2.1	0.7	NA	2010 Short Form
4/18/2014	3/4/2014	AP-16085	Encana	Stud Horse Butte 10-28 CF			10.9	4.1	0.0	0.0	37.6	9.9	-26.7	-5.8	-26.7	-5.8	NA	2010 Short Form
5/2/2014	3/17/2014	AP-16161	Encana	Stud Horse Butte 07-26 CF	MD-16161	6/3/2014	11.0	4.4	0.0	0.0	10.5	3.7	0.5	0.7	0.8	0.8	NA	2010 Short Form
5/16/2014	4/10/2014	AP-16227	Encana	Antelope 91-29H			7.9	3.3	0.0	0.0	0.0	0.0	7.9	3.3	11.9	3.6	NA	Full Application
5/23/2014	4/11/2014	AP-16228	Encana	Stud Horse Butte 4-28CF			7.0	3.2	0.0	0.0	6.8	2.9	0.2	0.3	0.3	0.3	NA	2010 Short Form
				Jonah Field EDIA M Program	MD-13171		535.8	0.0	134.8	0.0	0.0	0.0	401.0	0.0	-401.0	0.0	NA	
6/13/2014	5/9/2014	AP-16363	Encana	Stud Horse Butte 16-26 CF	MD-16363	7/15/2014	6.3	2.3	0.0	0.0	11.5	2.9	-5.2	-0.6	-5.2	-0.6	NA	2010 Short Form
6/13/2014	5/9/2014	AP-16361	Encana	Cabrito 13-19 CF			13.9	3.7	0.0	0.0	21.5	3.6	-7.6	0.1	-7.6	0.1	NA	2010 Short Form
	5/21/2014	AP-16435	Jonah Energy	Stud Horse Butte 08-14 CF	MD-16435 (corrected)	10/27/2014	9.1	3.7	0.0	0.0	8.8	3.6	0.3	0.1	0.4	0.2	NA	2010 Short Form
	5/22/2014	AP-16502	Jonah Energy	Jonah Office Building	MD-16502	9/5/2014	0.0	1.6	0.0	0.0	0.1	0.2	-0.1	1.4	-0.1	1.5	NA	Full Application - Engine Only
	5/27/2014	AP-16510	Jonah Energy	CAB 72-29 VRU Engine	MD-16510	9/12/2014	0.7	0.5	0.0	0.0	0.0	0.0	0.7	0.5	1.1	0.6	NA	Full Application - Engine Only
	6/3/2014	AP-16563	Jonah Energy	Stud Horse Butte 122-10 CF	MD-16563	10/21/2014	5.7	3.2	0.0	0.0	6.0	4.6	-0.3	-1.4	-0.3	-1.4	NA	Pinedale AQD Short Form
	6/9/2014	AP-16612	Jonah Energy	Stud Horse Butte 32-10	MD-16612	10/21/2014	5.1	1.7	0.0	0.0	4.5	1.2	0.6	0.5	0.9	0.6	NA	Pinedale AQD Short Form
	6/19/2014	AP-16686	Jonah Energy	Cabrito 13-30 CF			20.1	6.9	0.0	0.0	18.1	6.5	2.0	0.4	3.0	0.4	NA	Pinedale AQD Short Form
	6/23/2014	AP-16599	Jonah Energy	Stud Horse Butte 13-26 CF	MD-16599	10/21/2014	8.0	3.6	0.0	0.0	8.6	3.4	-0.6	0.2	-0.6	0.2	NA	Pinedale AQD Short Form
	6/24/2014	AP-16602	Jonah Energy	CAB 72-29 CF	MD-16602	10/21/2014	30.2	8.5	0.0	0.0	21.4	8.9	8.8	-0.4	13.2	-0.4	NA	Pinedale AQD Short Form
11/20/2014	6/26/2014	AP-16644	Jonah Energy	SIHI 6-32 CF	MD-16644	12/30/2014	9.3	3.6	173.4	14.9	0.0	0.0	-164.1	-11.3	-164.1	-11.3	NA	Pinedale AQD Short Form
	7/2/2014	AP-16632	Jonah Energy	SIHI 11-17 CF	MD-16632	10/28/2014	15.8	5.8	0.0	0.0	14.9	5.5	0.9	0.3	1.4	0.3	NA	Pinedale AQD Short Form
	7/2/2014	AP-16633	Jonah Energy	SIHI 7-16 CF	MD-16633	10/28/2014	13.3	6.0	0.0	0.0	8.0	3.6	5.3	2.4	8.0	2.6	NA	Pinedale AQD Short Form
	7/14/2014	AP-16726	Jonah Energy	SIHI 4-26 CF			29.7	8.3	0.0	0.0	34.8	11.5	-5.1	-3.2	-5.1	-3.2	NA	Pinedale AQD Short Form
	7/15/2014	AP-16730	Jonah Energy	SIHI 13-35 CF	MD-16730	11/12/2014	7.4	3.0	24.8	5.1	--	--	-17.4	-2.1	-17.4	-2.1	NA	Pinedale AQD Short Form
	7/16/2014	AP-16731	Jonah Energy	SIHI 4-35 CF	MD-16731	11/12/2014	6.6	2.6	0.0	0.0	10.0	2.1	-3.4	0.5	-3.4	0.6	NA	Pinedale AQD Short Form
	7/17/2014	AP-16719	Jonah Energy	YP 4-12 CF	MD-16719	11/12/2014	6.1	2.4	0.0	0.0	15.4	4.6	-9.3	-2.2	-9.3	-2.2	NA	Pinedale AQD Short Form
10/24/2014	7/28/2014	AP-16760	Jonah Energy	SIHI 16-32			2.8	1.4	0.0	0.0	1.8	1.6	1.0	-0.2	1.5	-0.2	NA	Pinedale AQD Short Form
11/7/2014	8/11/2014	AP-16871	Jonah Energy	SIHI 1-34	MD-16871	12/9/2014	6.6	3.4	0.0	0.0	4.8	1.8	1.8	1.6	2.7	1.8	NA	Pinedale AQD Short Form
11/7/2014	8/13/2014	AP-16870	Jonah Energy	SIHI 11-34	MD-16870	12/9/2014	5.6	2.8	0.0	0.0	7.1	2.9	-1.5	-0.1	-1.5	-0.1	NA	Pinedale AQD Short Form
11/7/2014	8/13/2014	AP-16868	Jonah Energy	YP B-13	MD-16868	12/9/2014	6.5	2.6	0.0	0.0	23.4	2.6	-16.9	0.0	-16.9	0.0	NA	Pinedale AQD Short Form
11/14/2014	8/18/2014	AP-16887	Jonah Energy	SIHI 1-29	MD-16887	12/16/2014	16.7	6.1	0.0	0.0	17.9	5.1	-1.2	1.0	-1.2	1.1	NA	Pinedale AQD Short Form
11/14/2014	8/18/2014	AP-16895	Jonah Energy	SIHI 124-11	MD-16895	12/16/2014	5.3	2.9	0.0	0.0	25.9	3.8	-20.6	-0.9	-20.6	-0.9	NA	Pinedale AQD Short Form
11/14/2014	8/18/2014	AP-16896	Jonah Energy	SIHI 2-34	MD-16896	12/16/2014	7.6	3.4	0.0	0.0	5.7	2.9	1.9	0.5	2.9	0.6	NA	Pinedale AQD Short Form
11/14/2014	8/18/2014	AP-16897	Jonah Energy	SIHI 7-15	MD-16897	12/16/2014	6.2	3.0	0.0	0.0	13.1	5.1	-6.9	-2.1	-6.9	-2.1	NA	Pinedale AQD Short Form
11/14/2014	8/20/2014	AP-16884	Jonah Energy	JF 1-8	MD-16884	12/16/2014	3.1	1.9	0.0	0.0	17.8	2.9	-14.7	-1.0	-14.7	-1.0	NA	Pinedale AQD Short Form
11/14/2014	8/22/2014	AP-16885	Jonah Energy	C-SIHI 10-30	MD-16885	12/16/2014	7.1	3.2	0.0	0.0	12.3	3.2	-5.2	0.0	-5.2	0.0	NA	Pinedale AQD Short Form
11/14/2014	8/22/2014	AP-16883	Jonah Energy	CAB 61-13	MD-16883	12/16/2014	12.8	4.0	0.0	0.0	13.1	4.0	-0.3	0.0	-0.3	0.0	NA	Pinedale AQD Short Form
11/14/2014	8/22/2014	AP-16882	Jonah Energy	JF 45-8H	MD-16882	12/16/2014	3.4	1.6	0.0	0.0	3.8	1.5	-0.4	0.1	-0.4	0.1	NA	Pinedale AQD Short Form
12/19/2014	8/29/2014	AP-A0000024	Jonah Energy	SIHI 1-32	P-0004218	1/21/2015	4.0	2.0	0.0	0.0	10.5	1.9	-6.5	0.1	-6.5	0.1	NA	Pinedale AQD Short Form
12/19/2014	8/29/2014	AP-A0000023	Jonah Energy	HAC 5-20	P-0004096	1/21/2015	1.9	2.1	0.0	0.0	6.9	0.8	-5.0	1.3	-5.0	1.4	NA	Pinedale AQD Short Form
12/19/2014	8/29/2014	AP-A0000025	Jonah Energy	CU 2-18	P-0004498	1/21/2015	1.4	1.1	0.0	0.0	7.2	0.6	-5.8	0.5	-5.8	0.6	NA	Pinedale AQD Short Form
12/19/2014	8/29/2014	AP-A0000027	Jonah Energy	CS 10-36	P-0004728	1/21/2015	1.8	1.8	0.0	0.0	7.2	0.6	-5.4	1.2	-5.4	1.3	NA	Pinedale AQD Short Form
12/19/2014	8/29/2014	AP-A0000026	Jonah Energy	SIHI 4-33	P-0004520	1/21/2015	5.4	2.7	0.0	0.0	4.6	3.0	0.8	-0.3	1.2	-0.3	NA	Pinedale AQD Short Form
	9/5/2014		Jonah Energy	SIHI 9-33			3.3	2.1	0.0	0.0	8.7	2.1	-5.4	0.0	-5.4	0.0	NA	Pinedale AQD Short Form
	9/5/2014		Jonah Energy	CF 15-24			1.7	1.2	0.0	0.0	10.5	0.6	-8.8	0.6	-8.8	0.7	NA	Pinedale AQD Short Form
	9/11/2014		Jonah Energy	CAB 14-25 Engine Mod			0.3	0.2	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	NA	Full Application - Engine Only
11/20/2014	9/11/2014	AP-A0000135	Jonah Energy	SIHI 15-27 microturbine removal	P-0000014	1/9/2015	-0.3	-0.2	0.0	0.0	--	--	-0.3	-0.2	-0.3	-0.2	NA	Full Application - Engine Only
1/2/2015	9/12/2014	AP-A0000053	Jonah Energy	CAB 14-25	P-0006018	2/3/2015	8.1	4.4	0.0	0.0	9.8	3.3	-1.7	1.1	-1.7	1.2	NA	Pinedale AQD Short Form
	9/12/2014		Jonah Energy	CF 16-2			1.9	1.4	0.0	0.0	8.9	0.5	-7.0	0.9	-7.0	1.0	NA	Pinedale AQD Short Form
1/2/2015	9/12/2014	AP-A0000052	Jonah Energy	CF 7-35	P-0005969	2/3/2015	1.8	1.1	0.0	0.0	6.3	0.5	-4.5	0.6	-4.5	0.7	NA	Pinedale AQD Short Form
1/2/2015	9/12/2014	AP-A0000063	Jonah Energy	COR 3-31	P-0006057	2/3/2015	10.1	2.6	0.0	0.0	37.7	3.6	-27.6	-1.0	-27.6	-1.0	NA	Pinedale AQD Short Form
	9/12/2014		Jonah Energy	CF 16-14			1.7	1.2	0.0	0.0	11.2	0.8	-9.5	0.4	-9.5	0.4	NA	Pinedale AQD Short Form
	9/19/2014		Jonah Energy	CS 12-36			2.3	1.7	0.0	0.0	8.5	0.5	-6.2	1.2	-6.2	1.3	NA	Pinedale AQD Short Form
	9/23/2014		Jonah Energy	SIHI 48-16			1.7	1.2	0.0	0.0	6.5	0.8	-4.8	0.4	-4.8	0.4	NA	Pinedale AQD Short Form
	9/23/2014		Jonah Energy	SIHI 48-22			2.7	1.7	0.0	0.0	27.5	4.2	-24.8	-2.5	-24.8	-2.5	NA	Pinedale AQD Short Form
	9/26/2014		Jonah Energy	JF 1-5X			6.9	3.2	28.6	4.8	--	--	-21.7	-1.6	-21.7	-1.6	NA	Pinedale AQD Short Form
	9/26/2014		Jonah Energy	SIHI 41-11			3.6	1.4	0.0	0.0	3.8	1.3	-0.2	0.1	-0.2	0.1	NA	Pinedale AQD Short Form
	9/26/2014		Jonah Energy	Tot Federal #1			3.3	1.2	0.0	0.0	6.3	0.0	-3.0	0.4	-3.0	0.4	NA	Pinedale AQD Short Form
	9/26/2014		Jonah Energy	SIHI 14-33			4.5	1.7	0.0	0.0	4.5	1.6	0.0	0.1	0.0	0.1	NA	Pinedale AQD Short Form
	9/29/2014		Jonah Energy	SIHI 11-20			13.2	3.6	0.0	0.0	28.5	5.1	-15.3	-1.5	-15.3	-1.5	NA	Pinedale AQD Short Form
	9/30/2014		Jonah Energy	SIHI 72-9			16.8	5.9	0.0	0.0	35.3	11.6	-18.5	-5.7	-18.5	-5.7	NA	Pinedale AQD Short Form
2/6/2015	11/3/2014	AP-A0000261	Jonah Energy	SIHI 12-36	P-0010206	3/10/2015	7.0	2.7	0.0	0.0	7.8	2.9	-0.8	-0.2	-0.8	-0.2	NA	IMPACT Forms
2/6/2015	11/3/2014	AP-A0000262	Jonah Energy	SAG 17-30	P-0009849	3/10/2015	2.3	1.5	0.0	0.0	4.9	2.1	-2.6	-0.6	-2.6	-0.6	NA	IMPACT Forms
2/6/2015	11/5/2014	AP-A0000263	Jonah Energy	SAG 73-20	P-0009874	3/10/2015	3.9	1.8	0.0	0.0	2.8	1.2	1.1	0.6	1.7	0.7	NA	IMPACT Forms
2/6/2015	11/7/2014	AP-A0000264	Jonah Energy	CAB 2-31	P-0010210	3/10/2015	3.9	1.7	0.0	0.0	6.1	2.1	-2.2	-0.4	-2.2	-0.4	NA	IMPACT Forms
1/23/2015	12/2/2014	AP-A0000142	Jonah Energy	Ten (10) Portable Rod Pump Engines	P-0002551	2/24/2015	10.0	7.0	0.0	0.0	--	--	10.0	7.0	15.0	7.7	NA	IMPACT Forms
	12/5/2014	AP-A0000426	Jonah Energy	JF 5-4			8.0	4.2	0.0	0.0	8.3	2.7	-0.3	1.5	-0.3	1.7	NA	IMPACT Forms
3/20/2015	12/5/2014	AP-A0000363	Jonah Energy	SIHI 3-34			6.7	3.3	0.0	0.0	7.2	2.6	-0.5	0.7	-0.5	0.8	NA	IMPACT Forms
	12/5/2014	AP-A0000429	Jonah Energy	SIHI 2-36			7.5	3.0	0.0	0.0	11.7	3.4	-4.2	-0.4	-4.2	-0.4	NA	IMPACT Forms
	12/5/2014	AP-A0000425	Jonah Energy	SIHI 10-33			5.6	2.5	0.0	0.0	16.4	4.8	-10.8	-2.3	-10.8	-2.3	NA	IMPACT Forms
	12/5/2014	AP-A0000427	Jonah Energy	SIHI 12-29			6.8	3.1	0.0	0.0	19.4	3.4	-12.6	-0.3	-12.6	-0.3	NA	IMPACT Forms
	12/5/2014	AP-A0000423	Jonah Energy	JF 3-5			3.1	1.6	0.0	0.0	10.2	1.2	-7.1	0.4	-7.1	0.4	NA	IMPACT Forms
	12/19/2014	AP-A0000415	Jonah Energy	JF 1-6			7.8	2.9	0.0	0.0	36.4	5.2	-28.6	-2.3	-28.6	-2.3	NA	IMPACT Forms
	12/19/2014	AP-A0000422	Jonah Energy	JF 1-4X			9.3	3.3	0.0	0.0	13.5	1.6	-4.2	1.7	-4.2	1.9	NA	IMPACT Forms
	12/22/2014	AP-A0000424	Jonah Energy	SIHI 11-22			7.6	3.7	0.0	0.0	40.7	6.8	-33.1	-3.1	-33.1	-3.1	NA	IMPACT Forms
	12/22/2014	AP-A0000421	Jonah Energy	SIHI 4-27			14.1	6.2	0.0	0.0	15.7	6.3	-1.6	-0.1	-1.6	-0.1	NA	IMPACT Forms
N/A	12/30/2014	Incorporated into previous WDEQ application	Jonah Energy	CAB 13-30			18.7	7.3	0.0	0.0	20.1	6.9	-1.4	0.4	-1.4	0.4	NA	IMPACT Forms
	1/16/2015	AP-A0000465	Jonah Energy	JF 2-8X			5.4	2.7	0.0	0.0	22.0	2.8	-16.6	-0.1	-16.6	-0.1	NA	IMPACT Forms
	1/16/2015	AP-A0000464	Jonah Energy	JF 24-9			2.4	1.3	0.0	0.0	5.0	1.4	-2.6	-0.1	-2.6	-0.1	NA	IMPACT Forms
	1/16/2015	AP-A0000463	Jonah Energy	JF 13-7			2.6	1.5	0.0	0.0	5.6	1.2	-3.0	0.3	-3.0	0.3	NA	IMPACT Forms
	1/19/2015	AP-A0000458	Jonah Energy	SIHI 1-35			10.8	4.2	0.0	0.0	11.0	3.3	-0.2	0.9	-0.2	1.0	NA	IMPACT Forms
	1/21/2015	AP-A0000487	Jonah Energy	JF 5-6			4.6	2.3	0.0	0.0	8.0	2.0	-3.4	0.3	-3.4	0.3	NA	IMPACT Forms

	1/27/2015	AP-A0000491	Jonah Energy	JF 1-5			6.7	3.0	0.0	0.0	29.5	4.0	-22.8	-1.0	-22.8	-1.0	NA	IMPACT Forms
	1/30/2015	AP-A0000515	Jonah Energy	YP 1-13			5.0	2.4	0.0	0.0	29.4	3.9	-24.4	-1.5	-24.4	-1.5	NA	IMPACT Forms
	1/30/2015	AP-A0000533	Jonah Energy	YP 7-2			3.0	1.5	0.0	0.0	4.4	1.3	-1.4	0.2	-1.4	0.2	NA	IMPACT Forms
	1/30/2015	AP-A0000532	Jonah Energy	YP 16-13			4.5	1.8	0.0	0.0	32.1	3.5	-27.6	-1.7	-27.6	-1.7	NA	IMPACT Forms
	1/30/2015	AP-A0000535	Jonah Energy	YP 16-12			5.1	2.6	0.0	0.0	30.2	2.8	-25.1	-0.2	-25.1	-0.2	NA	IMPACT Forms
	1/30/2015	AP-A0000534	Jonah Energy	YP 10-14			4.6	2.5	0.0	0.0	25.3	2.5	-20.7	0.0	-20.7	0.0	NA	IMPACT Forms
	3/19/2015		Jonah Energy	SHB 8-14			14.4	6.0	0.0	0.0	9.2	3.6	5.2	2.4	7.8	2.6	NA	IMPACT Forms
	3/23/2015		Jonah Energy	JF 1-5X			8.0	4.2	50.6	4.1	--	--	-42.6	0.1	-42.6	0.1	NA	IMPACT Forms
	3/23/2015		Jonah Energy	SHB 6-35			9.9	4.3	0.0	0.0	10.9	4.1	-1.0	0.2	-1.0	0.2	NA	IMPACT Forms
	3/26/2015		Jonah Energy	SHB 10-35 Compressor Engine			4.1	6.1	0.0	0.0	0.0	0.0	4.1	6.1	6.2	6.7	NA	IMPACT Forms
	3/26/2015		Jonah Energy	YP 4-12 Compressor Engine			6.5	9.5	0.0	0.0	0.0	0.0	6.5	9.5	9.8	10.5	NA	IMPACT Forms
					JONAH ENERGY TOTAL		4539.3	1456.3	3920.6	747.3	3094.0	762.3	-2475.3	-52.8	-2948.0	-99.4		